Production monitoring techniques of a knit composite industry

Md. Anowar Hossain
Department of Textile Engineering, City University; Permanent Campus, Khagan, Birulia, Savar, Dhaka, Bangladesh
(engr.anowar@yahoo.com)

Keynote of report

This report has brief summary of a knit composite industry in Bangladesh. This report focuses on production monitoring techniques of knitting, yarn coloration, fabric coloration, textile printing, garments production, textile machineries, quality management, store management and textile merchandising for the production engineers of a textile industry.

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Author profile edited in 2023

Open Researcher and Contributor ID (ORCID)
https://orcid.org/0000-0003-2880-6287
Uniform Resource Locator (URL) of Linkedin Profile
www.linkedin.com/in/engr-md-anowar-hossain-PhD-RMIT
Research gate profile
https://www.researchgate.net/profile/Engr-Md-Hossain

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8. Engr. Abdullahil Kafi, Lecturer
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12. Engr. Sujit Shaha, Lecturer
13. Engr. Kamruzzaman, Lecturer
14. Engr. Azhar Ali, Lecturer
15. Engr. Arifuzzaman, Lecturer

First Batch, City University

ACKNOWLEDGEMENT TO NIAGARA TEXTILES LTD.

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3. Engr. Saydur Rahman, Electrical Manager.
4. Engr. Zafor, Asst. Dyeing Manager
5. Engr. Monju Rahman, Senior Production Officer, Dyeing
6. Engr. Sohanur Rahman, Senior Production Officer, Dyeing
7. Engr. Khalid faisal, Production Officer, Dyeing
8. Engr. Arifur Rahman, Production Officer, Dyeing
9. Engr. Shimul kumar, Production Officer, Dyeing
10. Engr. Abdullah, Production Officer, Dyeing
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12. Engr. Asaduzzaman, Production Officer, Dyeing
13. Engr. Zafor Ahmed, Production Officer, Knitting
14. Engr. Monsi Abdus Salam, Production Officer, knitting
15. Engr. Mahfuz, First Batch, City University.

16. Engr. Mihir Ranjon Das, First Batch, City university

Overview of Niagara Textiles Ltd.

The internationally recognized Buyers or clients are looking for those countries for producing their apparel products where different types of mills have established as a one stop source for the global apparel market, satisfy and meet customer's expectation by developing and providing products and services on time, which offer value in terms of Quality, Price, Safety & Environmental impact. And also assure complete compliance with the international quality standards and also to provide the employees internationally acceptable working condition/standards. In Bangladesh, there are different types of Textile Industry those are producing high quality textile and apparel product. Niagara Textiles Ltd. is one of them. Niagara Textiles Ltd. is A France-Bangladesh joint venture limited company with Composite Knit Garments Manufacturer & Exporter, having all state-of-the-art facilities with annual turnover Tk. 10, 00, 00,000 to 12, 00, 00,000. They have Different types of knitting, Dyeing, Cutting, Sewing, and Finishing machines supplied by mostly Japan, Taiwan, U.K, USA, Turkey etc. which are very latest. It has high production where 18 tons of dyed and finished fabrics are produced per day. The production is controlled by technical persons. All of the decision makers of production sector in Niagara Textiles Ltd. are textiles graduates. All the chemicals and dyes use for dyeing and finishing are well branded. They produce their product for their buyer and client those are coming from international market like U.K, Ireland, France, Germany, Belgium, and Spain. They follow all the system for their machines maintenance so production cannot hamper.

In this report, I have tried to give some information about Niagara Textiles Ltd. and I have observed that Niagara Textiles Ltd. produce high quality fabric and fulfill the special requirements from the different types of buyers by following different internationally recommended standard method.

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INTRODUCTION

INTRODUCTION:

By means of practical knowledge it's not possible to apply the theoretical knowledge in the practical field. For any technical education, practical experience is almost equaled important in association with the theoretical knowledge.

The industrial attachment is the process, which builds understanding, skills and attitude of the performer, which improves his knowledge in boosting productivity and services. University education provides us vast theoretical knowledge as well as more practical

attachment, in despite of all these industrial attachment helps us to be familiar with technical support of modern machinery, skillness about various processing stages.

It also provides us sufficient practical knowledge about production management, work study, efficiency, industrial management, purchasing, utility and maintenance of machinery and their operation techniques etc. the above mentioned cannot be achieved successfully by means of theoretical knowledge only. This is why it should be accomplished with practical knowledge in which it is based on. Industrial attachment makes us reliable to be accustomed with the industrial atmosphere and improve courage and inspiration to take self responsibility.

Textile education can't be completed without industrial training. Because this industrial training minimizes the gap between theoretical and practical knowledge and make us accustomed to industrial environment. I got an opportunity to complete two-month long industrial training at **NIAGARA TEXTILES LTD.** which is a 100% export-oriented composite Knit Dyeing Industry. It has well planned & equipped fabric dyeing-finishing and garments units in addition to facilitate knitting and knitwear manufacturing.

PROJECT-DESCRIPTION

NIAGARA TEXTILES LTD

Fig: Niagara Textiles Ltd.

HISTORY:

Since 1980 to till date the Apparel sector of Bangladesh has passed through different huddles & obstacles and now has reached a stage where it can compete with all its competitors in price and quality as well as variety. In this scenario, Niagara Textiles Ltd. is a vertically set up textiles unit, which starts its operation in 2001 from knitting and ships the end product i.e. garments. In a short span of time Niagara Textiles Ltd. has gone from strength to strength to become one of the significant entities into sphere of activity. The factory is well equipped with high performance machinery and experienced technicians are engaged here to ensure the quality and customer satisfaction. We can produce international standard fabric and garments of any quality and quantity. Niagara always keeps pace with latest technology of Textiles industry.

Niagara Textiles Ltd. is a fully compliant factory. We never allow slave, child or prison labor or even force labor. We always provide all necessary safety measures & ensure the workplace safe, healthy & comfortable. We are going ahead to achieve our vision plan with our dynamic team members. To manufacture quality products as well as customer satisfaction is our ultimate goal. We are certified by **Oeko-Tex & WRAP**. We have also awarded as one of the best compliant factory by Labor Ministry of Bangladesh Govt. and BKMEA. Effluent Treatment Plant (ETP) established for hazard free environment. Our Social Officers regularly monitor social welfare issues at floors. As part of automation, implemented in-house developed ERP database software for MIS (Management Information System). Facilities available hare like in-house printing section and own covered van for carrying products on time.

COMPANY PROFILE:

GENEREL INFORMATION ABOUT THE MILL

Name of the project : **Niagara Textiles LTD.**

Type of the project : 100% Export oriented Knitwear industries

Year of establishment : It was established in **2001**.

Address : Factory, Chandra Circle, Union- Atabaha, Kaliakair,

Gazipur, Bangladesh.

Head office : 27, Bijoy Nagar, Suit# C-1(1st Floor), Dhaka-1000, Bangladesh.

Investors : Md. Nural Hasan, Managing Director.

History of the project : Niagara Textiles Ltd. has started manufacture and export

knitting and garments since 2001.

Project Cost : The project cost of Niagara Textiles Ltd. is nearly 100. Core taka.

Annual production Capacity **:** The annual production capacity in **Niagara textiles Ltd.** are given below-

Dyeing & Finishing Capacity : 7300 Tons. (Around)

Knitting Capacity: 3500Tons (Around)

Sewing: 40,000 pcs/day (Average)

Area **:** 2, 08,500 sq. ft.

Main Production	**:** Single/ Double Jersey , Single/ Double Lacoste, Pique, Wafle, Fleece, Terry, Interlock, Interlock Pique, Pleated Jersey, Mesh Fabric, Rib etc. with or without Spandex & Garments & All kinds of knitted tops and bottom.
Fax Number	**:** + 880 – 2 – 8363061, 06822-51213
Web Address	**: http://www.niagaratex.com**
Certification & awards	**:** ISO 9001:2000, Oeko-Tex & WRAP.
Workers and Stuff	**:** 4,500

The annual Production capacity of Niagara Textiles Ltd is an approximate idea, it may vary.

VISION & MISSION OF THE PROJECT:

The mission and vision of Niagara Textiles Ltd. is to manufacture and deliver high quality readymade garments (RMG) to its customers. The core objective is to attain and enhance customer satisfaction by providing on time delivery of desired quality readymade garments and also to increase efficiency of workforce.

To attain these objectives, the management of Niagara Textiles Ltd. has decided to adopt the following-

- To increase awareness regarding customers requirements throughout the organization.
- By providing training to develop efficiency of the employee.
- To collect customer's feedback regularly to know about their conception about their company and to take timely appropriate action.
- To reduce the percentage of wastage / rejection minimum by 2% per annum's implement and monitor ISO 9001:2000 quality management system within the organization.

LOCATION:

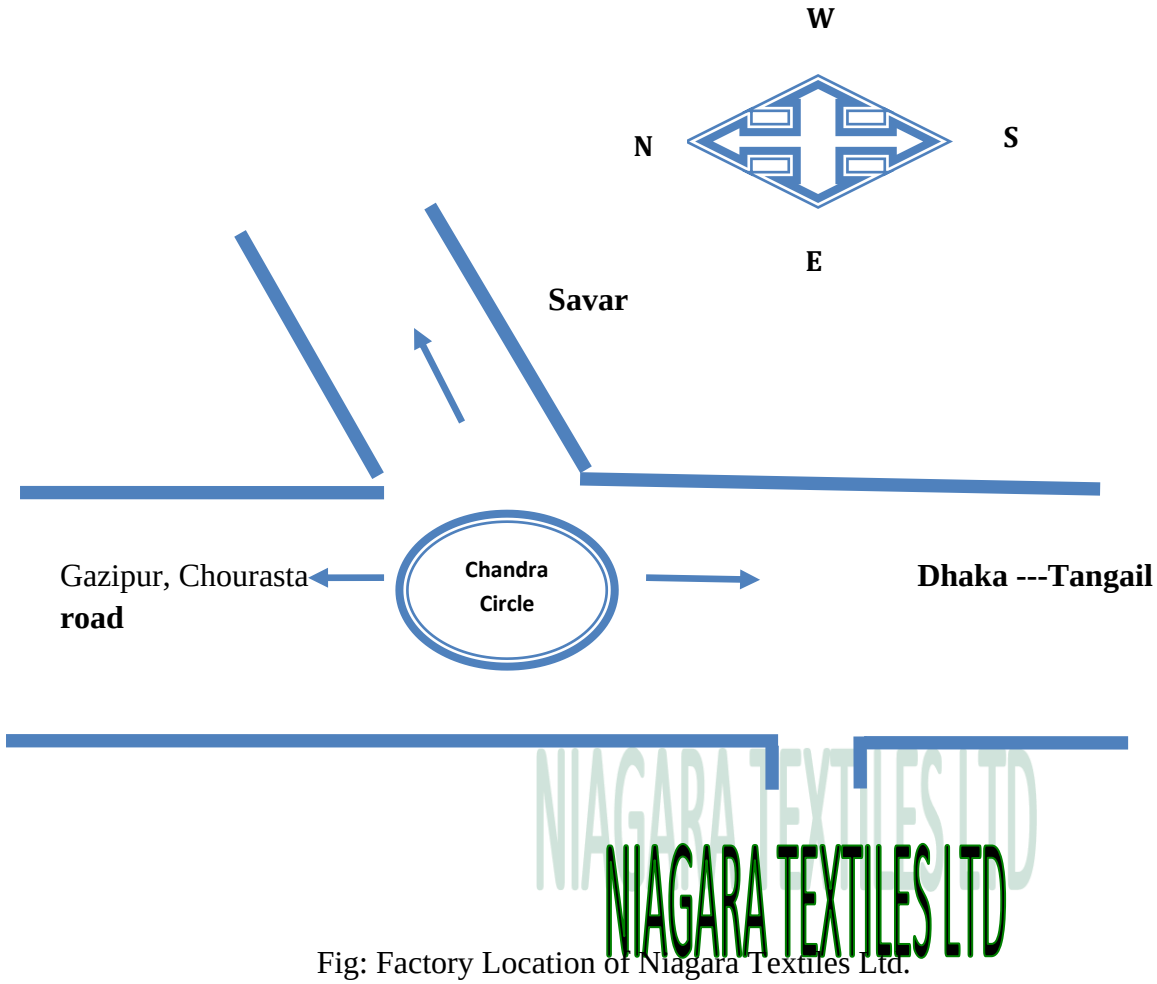


Fig: Factory Location of Niagara Textiles Ltd.

MANAGEMENT SYSTEM

MANPOWER MANAGEMENT:

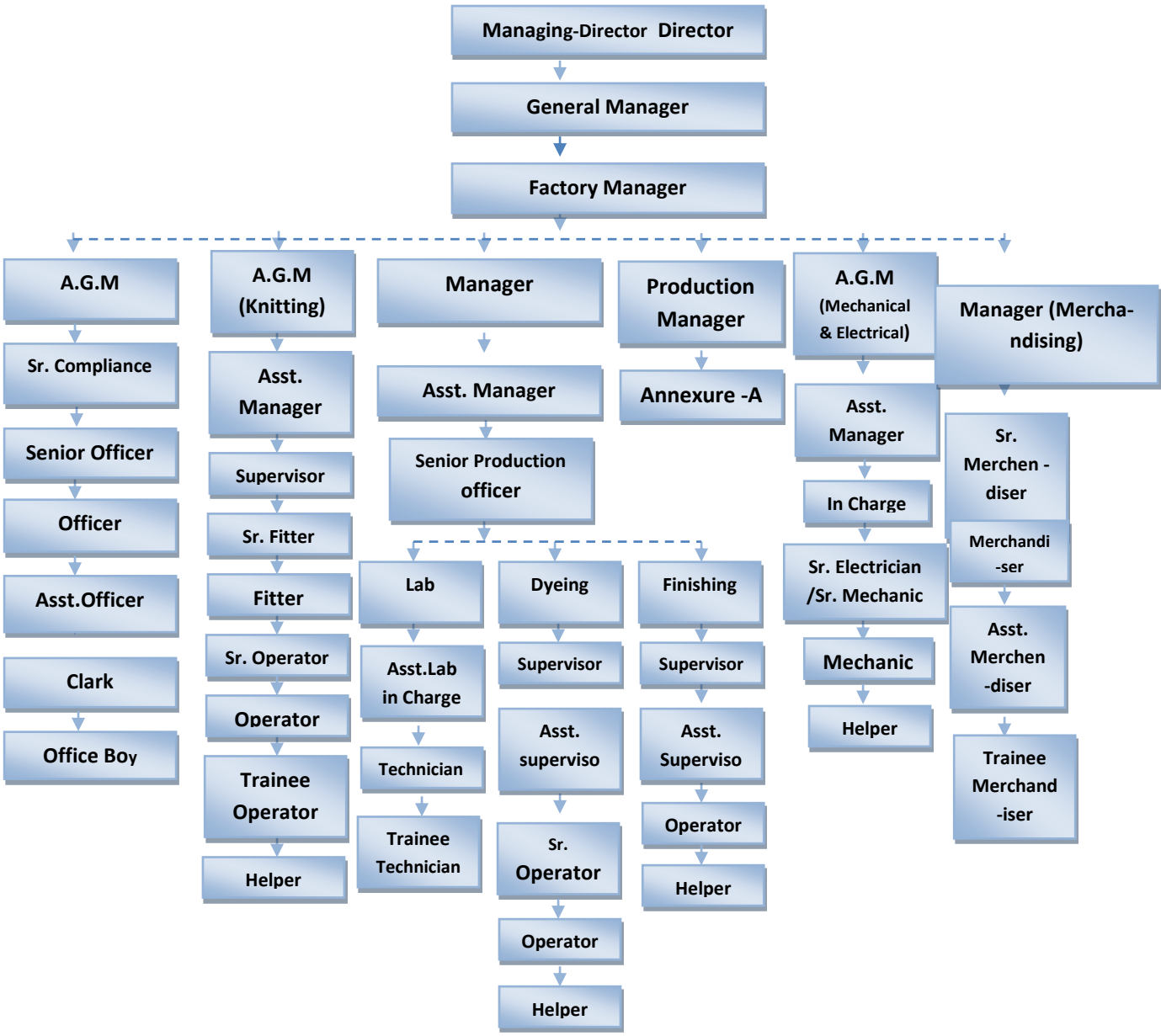
The Niagara Textiles Ltd. is committed to the best human workplace practices. Their goal is to continuously improve their Human resource policies and procedures through education, training, communication and employees involvement.

To that end the Niagara Textiles Ltd. has identified eight (8) areas of importance. The company commits to management review, employees open communication, policy development and coordination with the SA 8000 standard to comply with all state/local laws and industrial/factory laws of peoples republic of Bangladesh to provide a favorable employment environment that respects understands the needs of its employees.

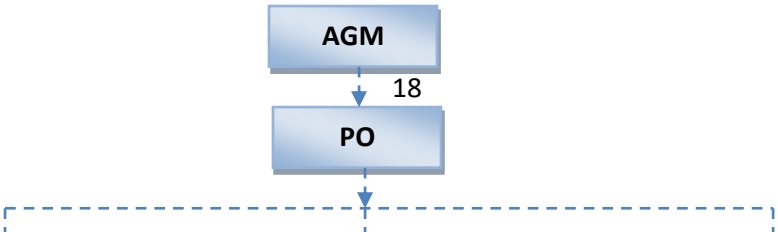
The company commits to inform all employees of its policy and position on the SA 8000 standard. All employees will be made aware of the policy and company statement upon implementation. Going forward all new employees will be trained on SA 8000 in new employees' orientation. Periodically throughout the year the company will reaffirm its commitment to the SA 8000 policy through employee communications such as office notice, demonstration and payroll stuffers. The eight (8) identified areas are:

- Child labor
- Forced labor
- Health & Safety
- Freedom of assembly/ Right to collectively bargain
- Discrimination
- Disciplinary practices
- Working hours
- Remuneration/ Compensation

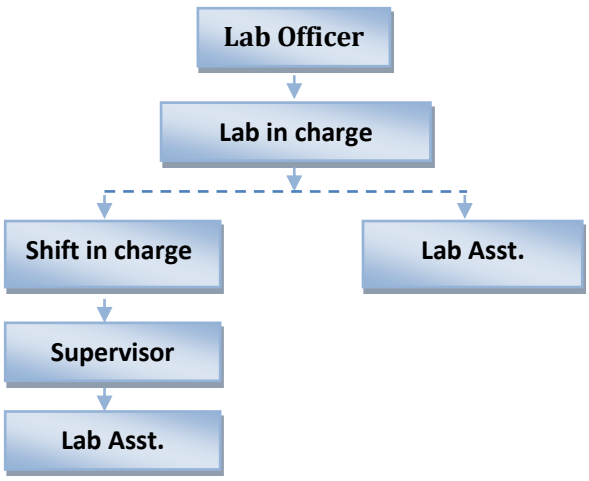
ORGANIZATIONAL STRUCTURE OF NIAGARA TEXTILES LTD:



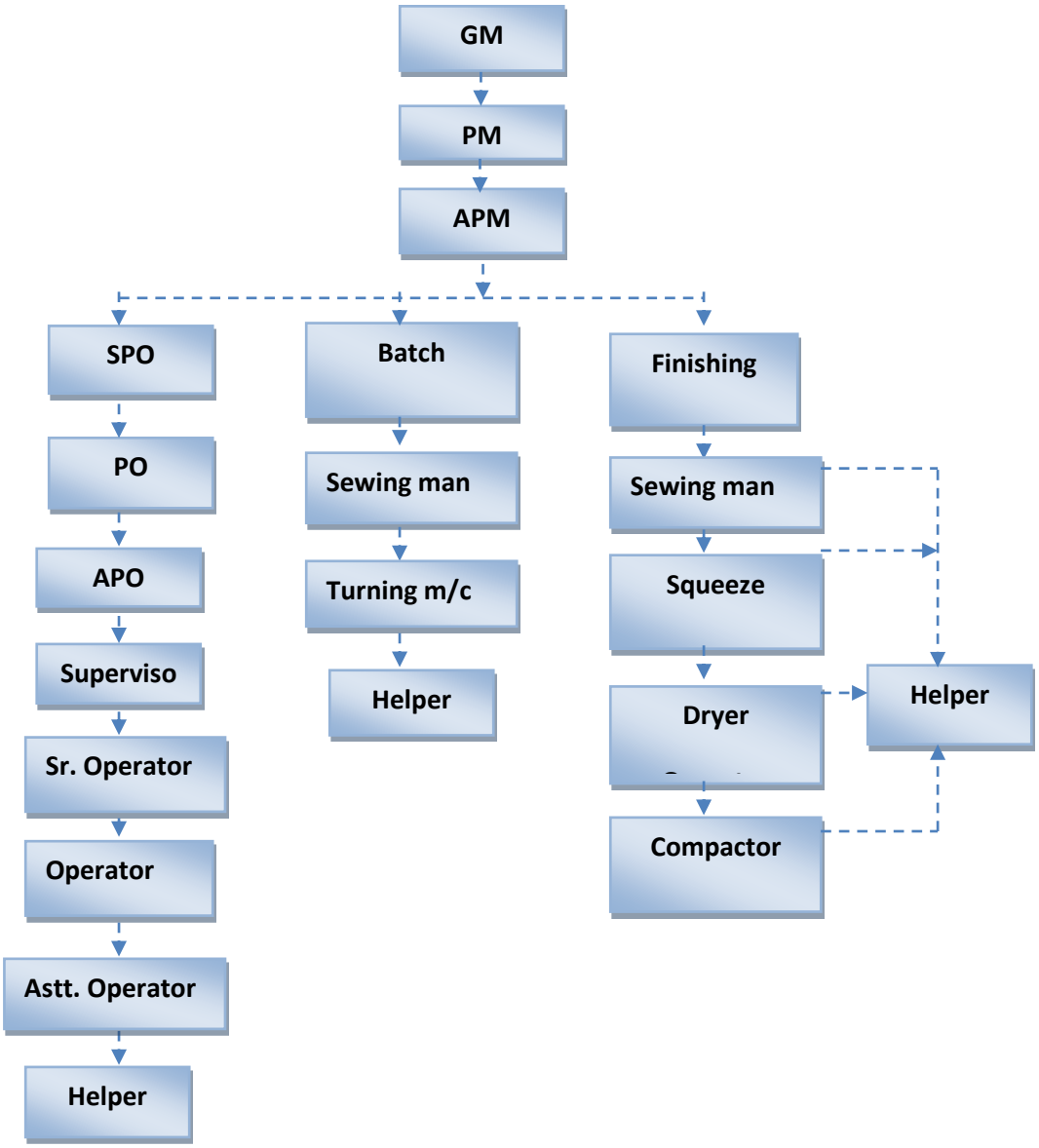
ORGAN GRAM OF KNITTING SECTION:



ORGAN GRAM OF DYEING LABORATORY:



ORGAN GRAM OF DYEING & FINISHING SECTION:



SECTION WISE MANPOWER:

Department	Manpower
Administration	**55**
Commercial	**42**
Finance and Accounts	**35**
Merchandising	**25**
Store	**70**
Knitting	**150**
Dyeing & Finishing	**460**
Garments	**3391**
Mechanical	**85**
Sub Total	**4313**

MANAGEMENT MEDIUM:

- Intercom telephone
- Fax
- E-mail
- Written letters & Papers
- Oral

MANAGEMENT SYSTEM:

- Buyer sample is send to G.M.
- Matching is done by lab in charge.

- Sample is prepared by dyeing master.
- Sample is send to the buyer for approval.
- Approved sample is returned and taken as STD. Sample for bulk production.
- Asst. dyeing master gives responsibilities to production officer.
- Then production officer, with the supervisors start bulk production.
- On line and off line quality check is done by lab in charge and asst. dyeing master.
- After dyeing finishing in charge controls the finishing process with the supervision of production officer.
- After finishing, the material is checked by dyeing master.
- Finally G.M. checks the result with dyeing master and decision is taken for delivery.

DUTIES & RESPONSIBILITIES OF PRODUCATION OFFICER:

- To collect the necessary information and instruction from the previous shift for the smooth running of the section.
- To make the junior officer understand how to operate the whole production process.
- To match production sample with target shade.
- To collect the production sample lot sample matching next production.
- To observe dyed fabric during finishing running and also after finishing process.
- To identify disputed fabrics and report to PM/GM for necessary action.
- To discuss with PM about overall production if necessary.
- To sign the store requisition and delivery challan in the absence of PM
- To execute the overall floor work.
- To maintain loading/ unloading paper.

RAW MATERIALS

RAW MATERIALS:

- Yarn
- Chemical

- Dyes

SOURCE OF YARN:

Niagara Textiles Ltd. Uses yarn from different factories of Bangladesh. They use spandex fibers come from different countries of the world. Some of the sources of yarn are given below:

MSA Spinning Mills, Karim Spinning, Shamsuddin Spinning Mills Ltd., Arif Knit Spinnning Ltd., Suddin Spinning Ltd., Synthetic Yarn Ltd., TAE Kwang Industrial Ltd., NRG Spinning Mills Ltd., M.S.R. KTR., Saiham Textile Mills Ltd., Sufia Cotton Mills Ltd., OTTO Spinning Ltd., Matin Spinning Ltd., Delta Spinning Ltd., Gulshan Spinning Ltd., Malek Spinning Ltd., Utha , Rahamat Textile Ltd., MALWA, Hanif Spinning Ltd., Comilla Spinning Ltd., Badsha Spinning Ltd., Rokara, CREORA, Matro, Fuad Spinning Ltd., Zaber Spinning Mills Ltd., Zarin Spinning Ltd., Techno, Fiber Land Trading Co. Ltd., M.S.M.L, White Star, Latif Spinning Ltd., ISRAQ Spinning Ltd., Checma Spinning Mills(India.)

Type of yarn	Count
Cotton	24^S, 26^S, 28^S, 30^S, 32^S, 34^S, 40^S
Polyester	75D, 72D,100D
Spandex yarn	20D,40D, 70D
Grey Mélange (C-90% V-10%)	24^S, 26^S
PC (65%Polyester & 35% cotton)	24^S, 26^S, 28^S, 30^S
CVC	24^S, 26^S, 28^S, 30^S

LIST OF DYES & AUXLARIES:

Sl. No.	Name of Dyes & Chemical
1.	SOLAZOL SCARLET SP3G
2.	SOLAZOL BLUE RSPL
3.	REACTIVE RED ME-4BL
4.	REACTIVE G.YELLOW ME-RL
5.	REACTIVE YELLOW ME-4GL
6.	REACTIVE ORANGE ME-2RL
7.	REACTIVE BLACK GR
8.	REACTIVE BLACK B
9.	REACTIVE NAVY BLUE ME-2GL
10.	REACTIVE DARK BLUE WR
11.	REACTIVE TERQUISE H-2GL
12.	REACTIVE NAVY WB
13.	REACTIVE RED BB
14.	Drimarine Blue CL-2RL
15.	Drimarine Red CL 5B
16.	Drimarine Yellow CL-2R
17.	Drimarine Blue CL-BR
18.	Drimarine Yellow HFR
19.	Drimarine Navy CL-GN
20.	Drimarine Red HF-2B
21.	Imcozin Blue E-NR
22.	Imcozin Red E-3BF
23.	Imcozin Yellow E-3R

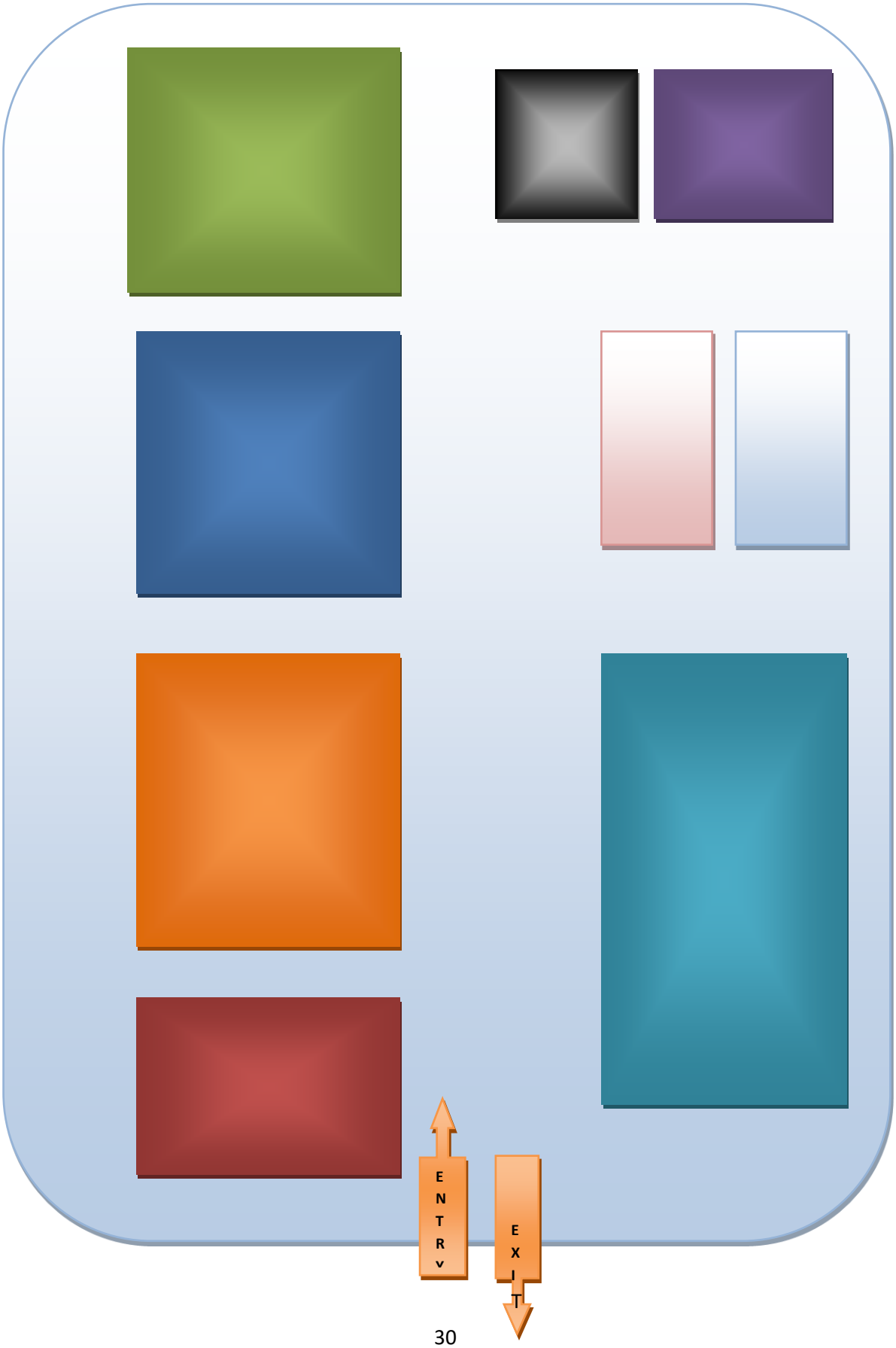
24.	Indofix Yellow HF-4GL
25.	Indofix Black B
26.	Remazol Blue RR
27.	Remazol Red RR
28.	Remazol Yellow RR
29.	Reactofix Turquise Blue G
30.	Perafix Black WNN
31.	Reactobond Blue RR
32.	Reactobond Red RR
33.	Reactobond Yellow RR
34.	Disperse Black EXNSF
35.	Disperse Blue 2GL
36.	Disperse Orange RSF
37.	Disperse Red CBNSF
38.	Disperse Red EFB
39.	Disperse Blue BRSF
40.	Disperse Yellow F-5GL
41.	Disperse Yellow HF-3RL
42.	Disperse Blue BGF
43.	Racto. Orange 3R (Discharge)
44.	Racto. Navy WB (Discharge)
45.	Racto. Red BB (Discharge)
46.	Pigment Blue (Fluorescent)
47.	Pigment Rose (Fluorescent)
48.	Pigment Yellow (Fluorescent)

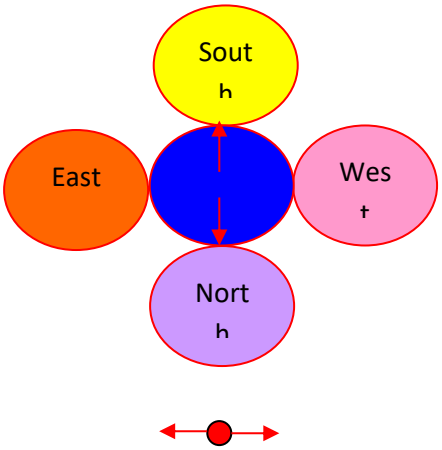
49.	Pigment Blue (SW-28)
50.	Pigment Rose (SE-27)
51.	Pigment Yellow (SW-15N)
52.	Glauber Salt (Leveling Agent)
53.	Soda Ash Light
54.	Caustic Soda
55.	Imerol PCLF (Wetting Agent)
56.	Sirrix 2UD (Sequestering Agent)
57.	Biopolish AL (Enzyme)
58.	Denzyme BP (Enzyme)
59.	Kappaquest FE (Sequestering Agent)
60.	Geistab RS (Stabilizer)
61.	Mollan 129 (Soaping Agent)
62.	Geilev CL (Leveling Agent)
63.	Eco Soap (Soaping Agent)
64.	Eco FIX-R (Fixer)
65.	Geisoft CAN (Anticreasing Agent)
66.	Romapon 173 (Anticreasing Agent)
67.	Kappa quest SM
68.	H_2O_2 (Bleaching Agent)
69.	Green Acid
70.	Syno White 4BK (Brightening Agent)
71.	HTS/AF-2000

72.	Magma CWS (Color) (Softener)
73.	Geisoft WCS (White) (Softener)
74.	GSS

LAY-OUT PLAN

OVERALL VIEW OF THE INDUSTRY:





SPECIFICATION:

Security office.

Administration office + Human Resources Department (HRD) + Marchanding section

Fabrics Store Knitting (Gr.Floor) + garments (2nd Floor+5rd floor),.

Fabric dyeing & finishing section.

Knitting (Gr. Floor) + +Garment section (1st Floor – 5th floor)

Yarn store + Fabric store

Maintenance building.

Generator house, Water Treatment Plant (WPT)

Effluent Treatment Plant (ETP)

LAY OUT OF DYEING & FINISHING SECTION:

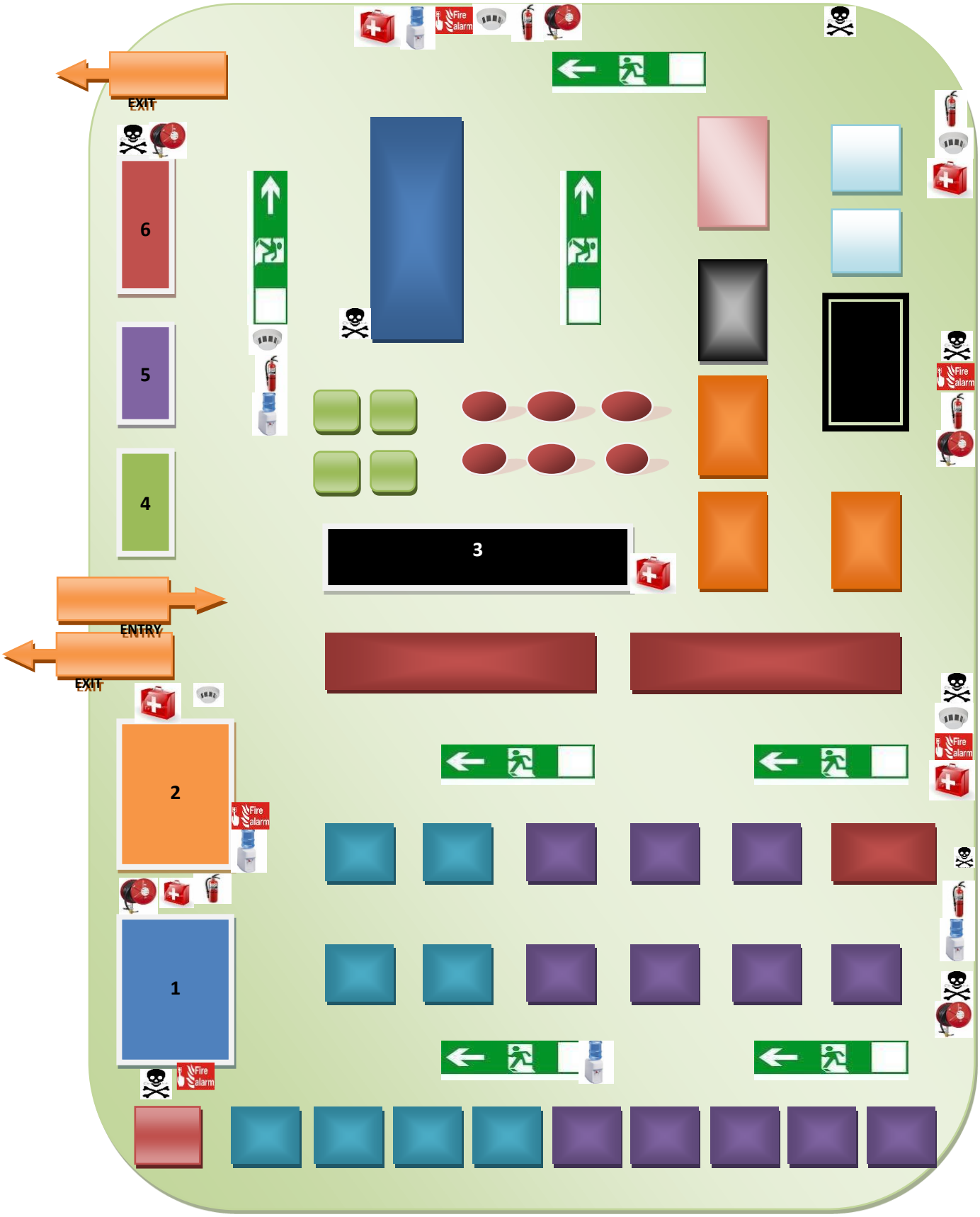


Fig: Layout plan of Dyeing & Finishing Section

SPECIFICATION:

Office Production Manager

Office Dyeing Manager

Dyeing Lab

Offline QC

Online QC

Inspection Table

Sample Dyeing Machine

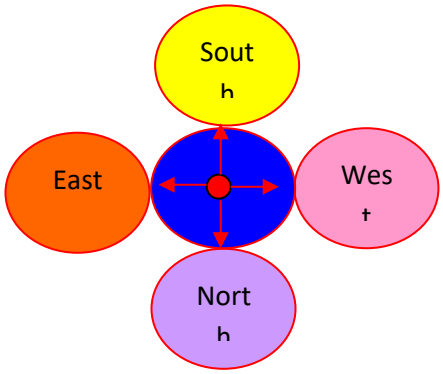
Dyeing Machine

Higher Capacity Dyeing Machine

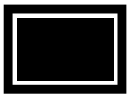
Boiler

Stanter M/C

Dewatering M/C




Tube Tex M/C


Serteks M/C


Dryer M/C


Fabric Inspection M/C


Dryer M/C


Washing M/C


Danger


Fire Extinguisher


Pure Drinking Water

Fire Alarm Switch


Hose Reel


First Aid Box


Smoke Detector

LAYOUT OF KNITTING SECTION:

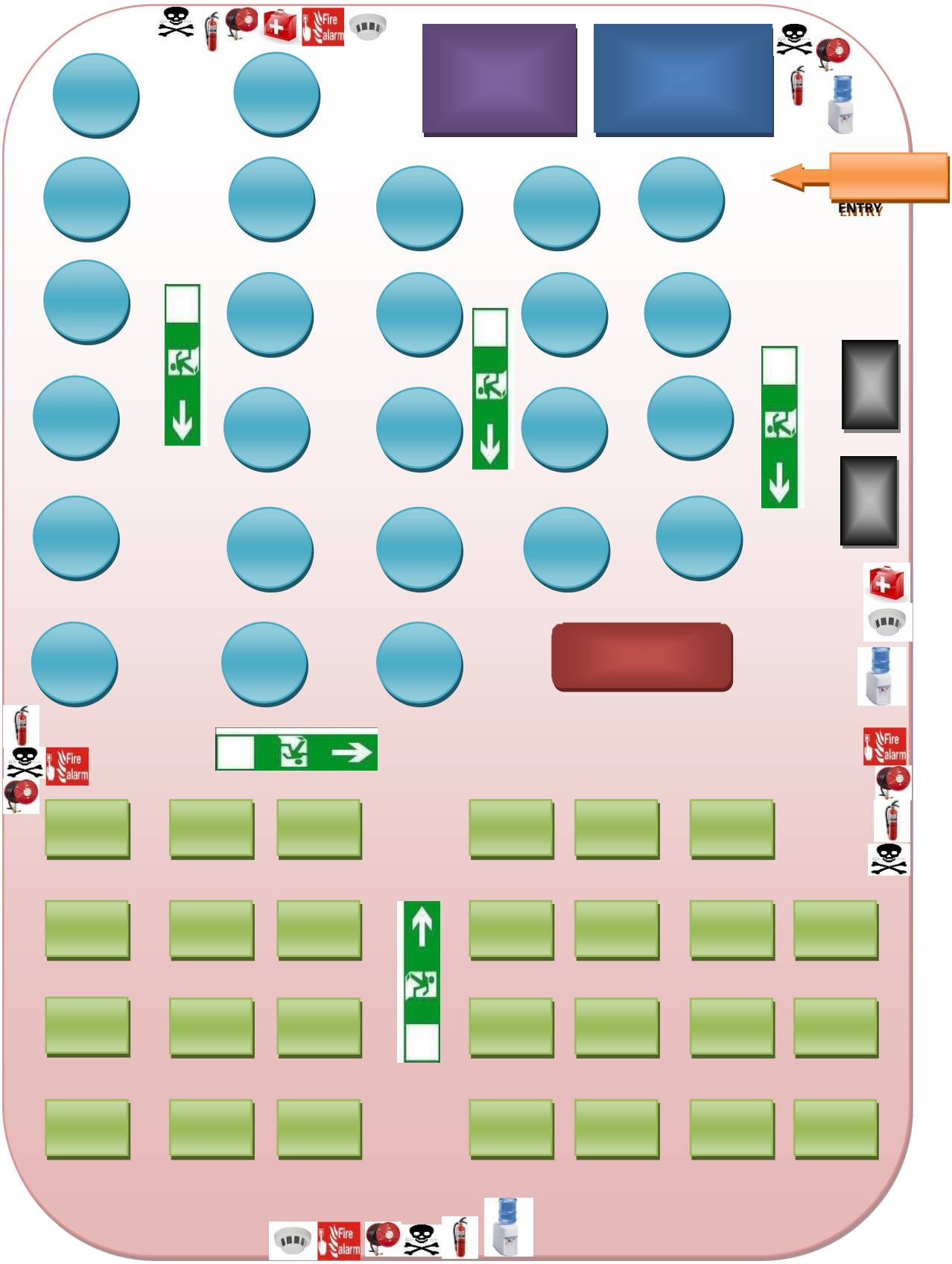


Fig: Layout plan of Knitting Section

SPECIFICATION:

Office Production Manager

Stuff Room

Circular Knitting M/C

Flat Bed Knitting M/C

Muller M/C

Fabric Inspection M/C

Danger

Fire Extinguisher

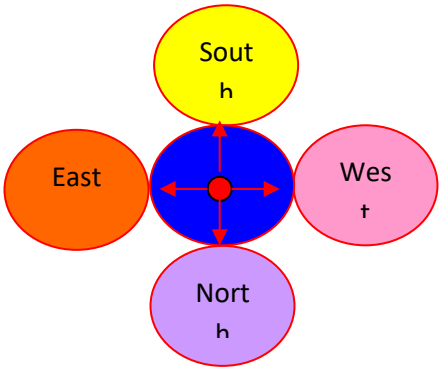
Pure Drinking Water

Fire Alarm Switch

Hose Reel

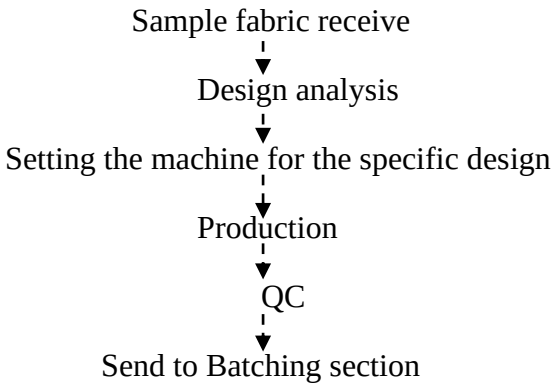
First Aid Box

Smoke Detector

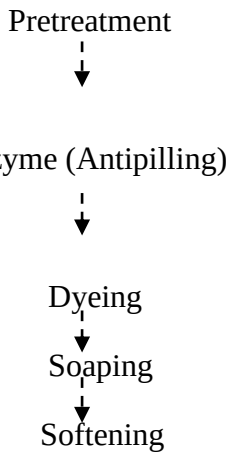


PRODUCTION & SEQUENCE OF PLANNING OPERATION

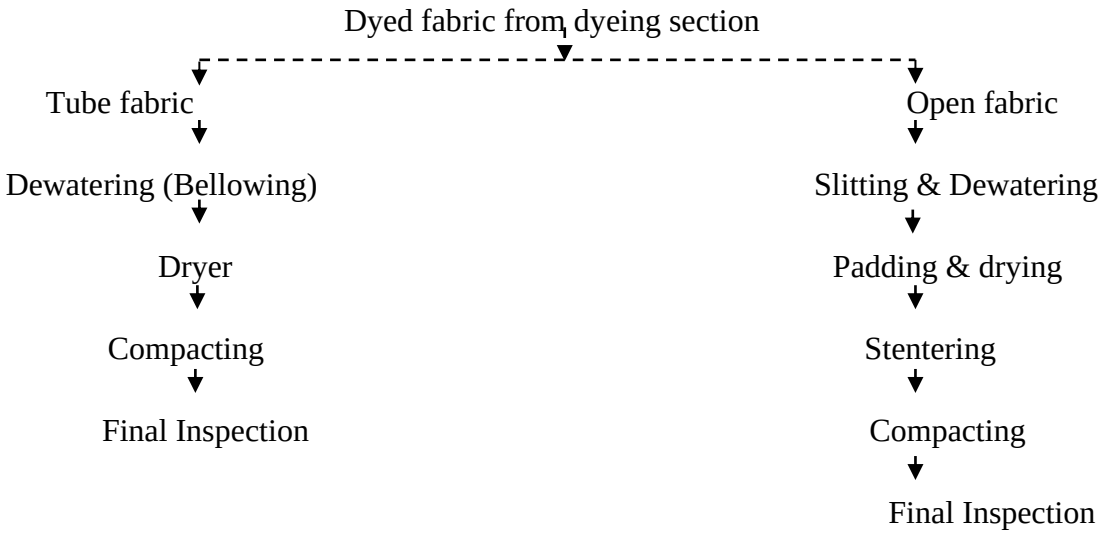
PRODUCTION FLOW-CHART OF KNITTING:



PRODUCTION FLOW-CHART OF DYEING:



PRODUCTION FLOW-CHART OF FINISHING:



PRODUCATION PARAMETER OF KNITTING:

- Machine Diameter;
- Machine rpm
- No. of feeds or feeders in use;
- Machine Gauge;
- Count of yarn;
- Required time (M/C running time);
- Machine running efficiency.

PRODUCATION PARAMETER OF DYEING:

pH Levels For Different Stages Of Cotton Dyeing :

- Initial Bath pH ➥ 6.5~7.0.
- Before Enzyme, bath pH ➥ 4.5~4.7.
- After Enzyme & Aquachoron, pH ➥ 5.5~6.0.
- Before Scouring & Bleaching, pH (With Enzyme) ➥ 5.5~5.8.
- Before Scouring & Bleaching, pH (Without Enzyme) ➥ 5.5~5.8.
- Scouring & Bleaching, bath pH ➥ 10.0~10.5.
- After Scouring & Bleaching, pH ➥ 8.5~9.0.
- Before Leveling Chemicals, pH ➥ 6.5~7.0.
- After Leveling Chemicals, pH ➥ 6.7~7.0.
- After Adding Dyes, pH ➥ 6.2~6.35.

- After Addition of Salt, pH ➥ 7.5~8.0.
- After Addition of Soda, pH ➥ 10.5~11.0.
- Before Hot Wash, Bath pH ➥ 6.8~7.2.
- Hot Wash, bath pH ➥ 8.5~8.7.
- Before Softener, bath pH ➥ 7.2~7.8.
- After Softener Addition, bath pH ➥ 6.5~6.8.

pH Levels for Different Stages of Polyester Dyeing:

- Initial bath pH ➥ 6.5~7.0.
- Scouring, bath pH ➥ 10.0~11.5.
- After Scouring, bath pH ➥ 8.5~9.0.
- Before Addition of Leveling Chemicals, pH ➥ 6.0~6.5.
- After Addition of Leveling Chemicals, pH ➥ 4.5~4.7.
- After Addition of Colors, bath pH ➥ 4.2~4.3.
- During Reduction Clearing, bath pH ➥ 10.5~11.5.
- Before Softener, bath pH ➥ 6.3~6.8.
- After Softener Addition, bath pH ➥ 5.8~6.2.

PRODUCATION PARAMETER OF FINISHING:

For Cotton Fabric:

Fabric Type	Overfeed %	Stretch %	Folder Tension	Machine Speed(m/min)
Single Jersey	+8% to +10%	2”-3”	-14% to -15%	60 -65
Single Lacoste	+4% to +5%	2”-4”	-17% to -18%	60 -65
Polo Pique	+3% to +4%	3”-4”	-17% to -18%	60 -65
Interlock	-1.5% to +2.5%	8”-10”	-18% to -20%	55 -60
Rib	+4.5% to +5%	--	-14% to -15.5%	60 -65

For Polyester Fabric:

Fabric Type	Overfeed %	Stretch %	Folder Tension	Machine Speed(m/min)
Single Jersey	+3% to +4%	2”-3”	-16% to -18%	55 -60
Single Lacoste	+4% to +5%	3”-4”	-18% to -20%	55 -60
Polo Pique	+1% to +2%	3”-4”	-17% to -18%	55 -60
Interlock	-3% to -4.5%	5”-6”	-18% to -20%	55 -60
Rib	+3% to +4%	--	-14% to -16%	60 -65

Remarks: This Data’s are varied depending upon the Gray G.S.M and Finished G.S.M and also on the dia of the fabric. All this parameters are suitable for G.G.S.M range 140~160 to get Fin.G.S.M 170~185 without Lycra Fabric. All This data`s are practiced in mills which may varied factory to factory.

END PRODUCTS OF KNITTING SECTION:

- S/J Plain
- Single lacoste
- Double lacoste
- Single pique
- Double pique
- Mini jacquard
- Terry
- Interlock pique
- Eyelet fabric
- Mash fabric
- Honeycomb fabric
- Face/Back rib
- 1*1 Rib fabric
- 2*2 Rib fabric
- Separation fabric
- Honeycomb
- Tripping
- Plain
- Emboss

LABORATORY

LABORATORY WORK SEQUENCE FLOW-CHART:

Lab dip receive

↓

Input id number entry

↓

By reffference←Recipe making→ from data color

Or, Shade book

↓

Recipe calculation

↓

Pipeting

↓

Fabric weighting & fabric input

↓

Fabric input into dye bath for dyeing

↓

Unloading

↓

Cold wash

↓

Hot wash→ with AlvatexS-Powder

↓

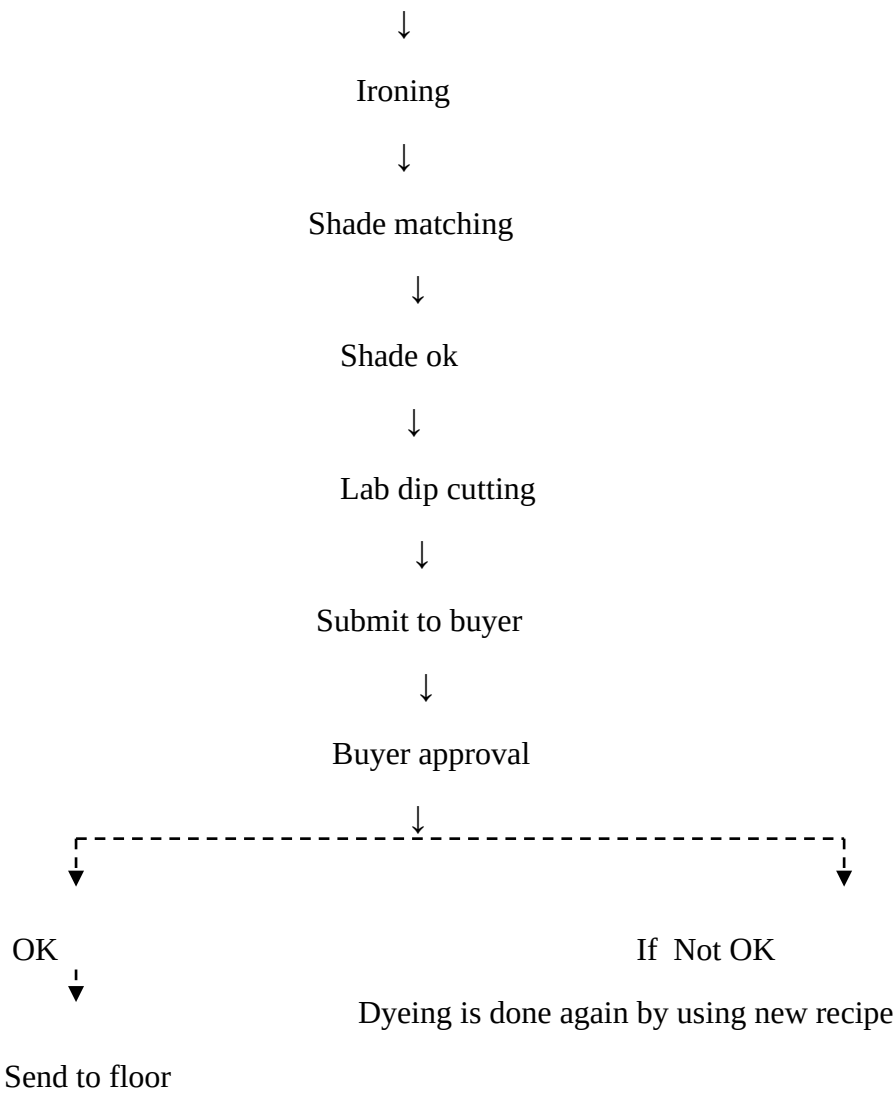
Hot wash→ normal water

↓

Acid wash→ normal water

↓

Drying


Ironing
Shade matching
Shade ok
Lab dip cutting
Submit to buyer
Buyer approval
OK
If Not OK
Dyeing is done again by using new recipe
Send to floor

M/C SPECIFICATION OF DYEING LAB:

M/C no.	M/C Name	Brand Name	Model	Origin
1	Lab Dyeing M/c	Fongs	F 312X574	Korea
2	Lab Dyeing M/c	Fongs	F 312X574	Korea
3	Lab Dyeing M/c	Ahiba Nuance	-	U.S.A
4	Dryer	ATL ATLAS	T522VW	UK
5	Washing M/C	Wascator	FOM 71CLS	Sweden
6	pH Meter	HANNA	pH 211	Romania
7	Spectrophotometer	Data Color	SF 600X	U.S.A
8	Light Box	Data Color	-	U.S.A
9	Mechanical Shaker	GLF	-	Korea
10	Color Fastness to Rubbing Tester	Crock master	-	UK
11	Temperature & R.H Meter	Thermo Hygrometer	302	UK
12	GSM Cutter M/C	-	-	UK

LAB DYEING PROCESS FOLLOW UP:

Lab dip receives

↓

Input id number entry

↓

Recipe making:

↓

Recipe calculation

↓

Biker washing

↓

Color Pipeting

↓

Fabric weighting by electronic balance

↓

Fabric input into Biker

↓

Water pipeting

↓

Salt pipeting

↓

Levelling agent Pipeting

↓

Stiring-15 min

↓

Soda adding

↓

Stiring-15 min

↓

Biker covering

↓

Loading in machine –Temp 40°C

↓

Steam-up at 60°C

↓

Run Time-60 min

↓

Cooling at-50°C

↓

Unloading

↓

Cold wash

↓

Hot wash-95°C

↓

Hot wash

↓

Acid wash

↓

Cold wash

↓

Drying

↓

Ironing

↓

Sticker attaching

↓

Shade matching

↓

Shade ok

↓

Lab dip cutting

↓

Submit to buyer

↓

Buyer approval

↓

Send to floor

Definition of Carbonizing:

A process of removing cotton part from Polyester & cotton blended fabric which is called carbonizing.

Process flow chart of carbonizing:

70%- Sulfuric Acid & 30%-Water poured in a Biker

↓

Polyester & cotton blended fabric is taken in Biker

↓

Stiring-5 min

↓

Washing

↓

Cotton part is dissolved in water

↓

Polyester part is collected

SOME IMPORTANT TEST OF DYEING LAB:

Dyestuff Strength Test:

Dyestuff Collection

↓

Dyeing the fabric with present dyestuff which is selected for testing

↓

Dyeing the fabric with standard dyestuff in lab

↓

Observation two shade efficiently

↓

If shade matching is occurred

↓

Then, Dyestuff strength is ok & Dyestuff is accepted

↓

If shade matching is not occurred

↓

Then, Dyestuff strength is not ok & Dyestuff is rejected

Hardness test of water:

Required chemicals

1. Buffer→ 5drops
2. Indicator→ 1drops
3. EDTA→ dropped until getting pink color.

Procedure:

1. At first, 5ml water is taken in a biker.
2. Then, 5 drops buffer is added into the water
3. It is shaken for few minutes.
4. Then, 1 drop indicator is added.
5. After adding the indicator, EDTA solution is added with the help of a test tube until getting pink color.

Result:

If we see, 0.1 ml will required for obtain result then we multiply 0.1 with 300 and result is 30 then hardness is 30.

Comments: Water hardness below 50 is good but above 50 is not good.

Color fastness to rubbing (wet & dry):

Procedure:

Dry:

1. At first, a sample of size (14 × 5) cm is taken at Wales & Course wise.
2. The crocking cloth is put on to the finger & joined by finger clip & run 10 times in 10 seconds manually & assessed the crocking cloth with gray scale.

Wet:

1. The crocking cloth is placed on water, it will sucked some water and then squeeze the crocking cloth.
2. Then, the wet rubbing cloth is placed on to the finger and joined with finger clip and run 10 times in 10 seconds manually. Then the crocking cloth is assessed by gray scale for wet rubbing.
3. Wet and dry rubbing are checked according to buyer's requirement.

Color fastness to washing. (ISO/05-CO6):

Procedure:

- Size of specimen: Cut sample & multifibre at (10 × 2)cm then stitch.
- Detergent: 4g/l ECE detergent (WOB) + 1g/l sodium per borate put in distilled water & cooled at 20°C & measured P^H (where necessary).
- Run the program in the following way: -
- Test no. Temp°C Liq.volume ml Time min. Steel balls Adjust pH

C2S	60°C	50	30	25	10.5±1

- Rinse the sample twice with cold water.
- Dry at 60°C by hanging or by flat iron pressing but temperature should not less more than 150°C.

Shrinkage & Spirality test:

Buyer's requirements:

Template size: 50cm & 35cm, 25.5cm &18cm (use after quick wash).

Shrinkage: length wise--- 5%

Width wise----5%

Spirality: Left -------- 5%

Right -------- 5%

Procedure:

At first take two ply of fabric & put the template (50cm) on to the fabric. The template has 8 holes. Both length & width wise the template holes can measure 35cm at 3 places. Then we mark the 8 holes by permanent marker & also at the edges of the template. Then sewn the fabric & it is given to the washing m/c for run at 60°C for 60minutes with water. After that dry the sample & then measure the fabric

Spin speed --- 500rpm

Drum speed--500rpm

AVAILABLE STOCK SOLUTION:

- Red – 0.1%, 0.5%, 1.0%, 2.0% (very common)
- Yellow – 0.1%, 0.5%, 1.0%, 2.0% (very common)
- Blue - 0.1%, 0.5%, 1.0%, 2.0% (very common).

Procedure:

- To prepare 0.1% Stock solution, it is necessary to mix 0.1 g dye and 100 cc water.
- To prepare 0.5% Stock solution, 0.5 g dye stuff is mixed with 100 cc water.
- To prepare 1.0% & 2.0% Stock solution similar procedure is followed.

- To prepare 10% Stock solution of Soda ash, 10 g Soda is mixed with 100 cc water.

CALCULATION:

Usually following calculations are followed -

$$\text{Dye Solution} = \frac{\text{Recipe \% * Sample Weight}}{\text{Stock solution \%}} \text{ (cc).}$$

$$\text{Salt} = \frac{\text{(Recipe \% * Liquor)}}{1000} \text{ (gram per liter, g/l).}$$

$$\text{Soda Solution} = \frac{\text{(Recipe \% * 100 * Liquor)}}{\text{(1000 * Stock solution \%)}} \text{ (cc).}$$

SAMPLE CALCULATION FOR 0.5% SHADE:

- Sample wt. = 5 mg
- Material liquor ratio = 1: 10
- Total liquor (5 × 10) = 50 cc

$$\text{Dye solution required} = \frac{5 \times 0.5\%}{1\ \%} = 2.5 \text{ cc}$$

- $$\text{Salt solution required} = \frac{50 \times 25}{20 \times 10} = 6.25 \text{ cc}$$

$$50 \times 10$$

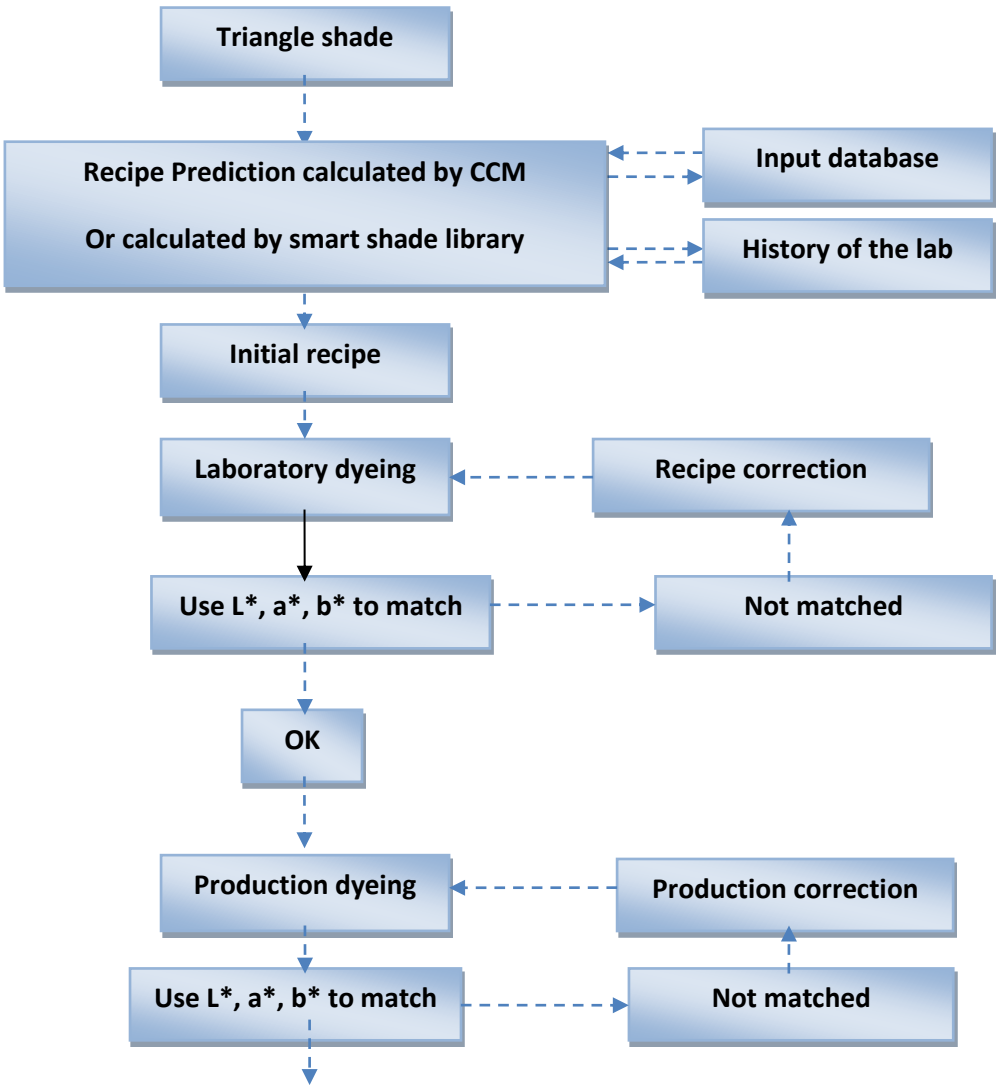
- Soda ash solution required = $\frac{}{20 \times 10}$ = 2.5 cc
- Water required {50 - (2.5 + 6.25 + 2.5)} = 38.75 cc

Working Procedure:

All ingredients had been taken according to the recipe into the pot of sample dyeing machine. At a room temp the material had run then after 10 mins started to rise the temperature at 1°C/ min. to get 60°C temperature. For performing the required dyeing temperature it took 30 mins. The material had dyed at 60°C for 45 mins. then the temperature was reduced at room temperature within in 10 mins. The fabric washed in cold water & then the material was washed in 1 gm/l soap solution (liquor ratio 1:20) at 90°C temperature for 15 mins. Then after rapidly cold washing the material was dried & preserved.

INTRUMENTAL PROCESS OF COLOR MATCHING:

Spectrophotometer flow Chart




OK
Finished


SPECTROPHOTOMETER
SAMSUNG

Cite: Md. Anowar Hossain (2010), Production monitoring techniques of a knit composite industry, Niagara Textiles Ltd, Department of Textile Engineering, City University; Permanent Campus, Khagan, Birulia, Savar, Dhaka, Bangladesh

Functions of spectrophotometer:

- Color difference
- Metamerism
- Pass/fail operation
- Fastness rating
- Shade library
- Cost comparison
- Color match production
- Reflectance curve.

KNITTING-DEPARTMENT

DEFINITION OF KNITTING:

Knitting is the method of making fabric by transforming continuous strands of yarn into a series of interloping loops, each row of such loops forms the one immediately preceding it.

WORKING FLOW CHART OF KNITTING SECTION:

Order Submitted

Or,

Order Received

↓

Fabric type, fabric structure and Fabric Finished GSM are identified

↓

Yarn Selection according to requirement

↓

Grey GSM & Stitch Length are selected

↓

Machine Dia Selection

↓

Feeding the yarn cone in the creel

↓

Feeding the yarn in the feeder via trip-tape positive feeding arrangement and tension device

↓

Knitting

↓

Withdraw the rolled fabric and weighting

↓

Inspection

↓

Numbering

↓

Sample Production

↓

Bulk Production

FOLLOWINGS ARE DONE IN KNITTING ACTION:

1. Creel set-up
2. Feeder set-up
3. Yarn is passed in the pipe by air pressure.
4. Yarn is arranged through the guide bar.
5. Cam arrangement.
6. GSM pulley arrangement
7. Take-up unit set-up.
8. Stitch controller set-up
9. Machine is clean by air pressure.
10. Machine is run.

FOLLOWINGS ARE DONE IN CAM ARRANGEMENT:

1. Firstly, Design is identified.
   Such as:

   - Single lacoste
   - Double lacoste
   - Single pique
   - Double pique
   - Single Jursey
   - Double Jursey etc.

2. Top butt and bottom butt needles are arranged.
3. Yarn is passed through needle hole
4. Then, Machine is run.

CAREFULNESS OF KNITTING OPERATION:

1. Power switch on
2. Checking the switch point
3. Checking the machine gauge
4. Checking the yarn guide
5. Monitoring the GSM & Stitch pulley
6. Monitoring the needle detector
7. Monitoring oil line
8. Observation of needle & gear oil
9. Observation of electrical option
10. Observation of Mechanical option

GSM FIND OUT:

1. At first, fabric is cut by cutter machine
2. Fabric portion is weighted by electronic balance
3. Calculated weight will be the GSM of fabric.

STITCH LENGTH FIND OUT:

1. At first, Fabric loop (100) is counted.
2. Then, Fabric counted area is identified by a color.
3. Single yarn is divided from the side of fabric for measuring stitch in cm
   Such as:

For 28cm, stitch→→→2.8

For 30 cm, stitch→→→3.0

RELATION BETWEEN GSM & STITCH:

Stitch ↑ (+), GSM ↓ (-)

Stitch ↓ (-), GSM ↑ (+)

EXAMPLE:

Fabric type	Fabric GSM	Yarn count	Stitch Length
Single Jursey	120	34	2.80
	140	30	2.80
	160	28	2.70

	180	24	2.80
	200	20	3.0

DIFFERENT PARTS OF CIRCULAR KNITTING MACHINE:

1. Guide bar
2. Neddle
3. Needle detector
4. Sinker
5. Cam
6. Feeder
7. GSM pulley
8. Stitch pulley
9. Fabric roller
10. Speed controller
11. Bearing (Circling point)
12. Pipe Stand
13. Yarn pipe
14. Fan
15. Fabric guide bar

DIFFERENT PARTS OF FLAT KNITTING MACHINE:

1. Carriage
2. Feeder
3. Top tensioner
4. Side tensioner
5. Neddle
6. Cam
7. Sinker

PRODUCT MIX:

- Count: 20-30
- Cotton(card & comb)
- PC
- Filament yarn
- Acrylic
- PVC
- Lycra

MACHINE DESCRIPTION OF KNITTING SECTION:

M/CS/L	MC Qty	MC Dia	M/C Gauge	M/C Model	No. Of Feeder	No. Of Needle	M/C Spec	Brand	Origin
1	1	36	18	PL-XS3C/B	64	4080	S/J	Pailung	Taiwan
2	1	30	22	PL-XS3/A/C	54	3360	S/J	Pailung	Taiwan
3	1	34	18	PL-XR3A/C	60	1896	S/J	Pailung	Taiwan
4	1	36	24	PL-XS3B/C	108	2712	S/J	Pailung	Taiwan
5	1	34	24	PL-XS3B/C	102	2544	S/J	Pailung	Taiwan
6	1	25	24	PL-XS3B/C	74	1872	S/J	Pailung	Taiwan
7	1	34	24	PL-XS3B/C	102	2544	S/J	Pailung	Taiwan
8	1	34	24	PL-XS3B/C	102	2544	S/J	Pailung	Taiwan
9	1	34	24	PL-XS3B/A	102	2544	S/J	Pailung	Taiwan
10	1	36	22	PL-XS3/A/B	106	2472	S/J	Pailung	Taiwan

11	1	30	22	PL-XS3/A/C	108	2063	S/J	Pailung	Taiwan
12	1	36	22	PL-XS3/A/B	106	2472	S/J	Pailung	Taiwan
13	1	36	18	PL-XRA/CF	72	1992	Rib/Inter	Pailung	Taiwan
14	1	38	18	PL-XRA/CF	76	2025	Rib/Inter	Pailung	Taiwan
15	1	40	18	PL-XRA/CF	80	2256	Rib/Inter	Pailung	Taiwan
16	1	42	18	PL-XRA/CE	84	2376	Rib/Inter	Pailung	Taiwan
17	1	38	22	PL-XSB/C	72	2122	Rib/Inter	Pailung	Taiwan
18	1	34	22	TF-O8/CF	85	2352	Rib	Terrot	Germany
19	1	36	22	TF-O8/CF	82	2452	Rib	Terrot	Germany
20	1	30	22	TF-O8/CE	80	2355	Inter	Terrot	Germany
21	1	36	22	TF-O8/CE	82	2054	Inter	Terrot	Germany
22	1	36	18	TF-O8/CE	85	2364	Inter	Terrot	Germany
23	1	38	18	TF-O8/CE	80	2350	Inter	Terrot	Germany
24	1	30	20	FOHN/C To JOHN/C	90	2250	Fleece	Orizo	Italy
25	1	30	18	CMO/4A	60	1680	Rib/Inter	Orizo	Italy

26	**1**	**24**	**19**	**V3**	**66**	**1450**	**Twill Tape**	**Muller**	**China**
27	**1**	**20**	**14**	**KH-313**	**55**	**1360**	**S/J Engg. Striper**	**Kauo Heng**	**Taiwan**
28	**26**	**19**	**11**	**CMT 211**	**48**	**1125**	**S/JEngg. Striper**	**Stool**	**Germany**
Total	**53**								

CAM & NEEDLE ARRANGEMENT OF SOME KNIT STRUCTURE:

Single Jersey: (4 track)

Cam arrangement	Needle Set out
K K K K	1
K K K K	2
K K K K	3
K K K K	4

Single Lacoste:

Cam arrangement	Needle Set out
K K T K	1

T K K K	2
K K T K	3
	2

Double Lacoste:

Cam arrangement	Needle Set out
K K K T T K	1
T T K K K K	2
K K K T T K	3
	2

Polo pique:

Cam arrangement	Needle Set out
K K T T	1
T T K K	2
K K T T	3
	2

END PRODUCTS OF CIRCULAR KNITTING MACHINE:

Single Jersey M/C:

- S/J Plain
- Single Lacoste
- Double Lacoste
- Single pique
- Double pique
- Mini jacquard
- Terry

Interlock M/C:

- Interlock pique
- Eyelet fabric
- Mash fabric
- Honeycomb fabric
- Face/Back rib

Rib M/C:

- 1*1 Rib fabric
- 2*2 Rib fabric
- Separation fabric
- Honeycomb

End products of Flat Bed Knitting Machine:

- Tripping
- Plain
- Emboss

CONSIDERABLE POINTS TO PRODUCE KNITTED FABRICS:

When a buyer orders for fabric then they mention some points related to production and quality. Before production of knitted fabric, these factors are needed to consider. Those are as follows-

- Type of Fabric or design of Fabric.
- Finished G.S.M.
- Yarn count
- Types of yarn (combed or carded)
- Diameter of the fabric.
- Stitch length
- Color depth.

METHODS OF INCREASING PRODUCATION:

By the following methods the production of knitted fabric can be increased –

By increasing m/c speed :

Higher the m/c speed faster the movement of needle and ultimately production will be increased but it has to make sure that excess tension is not imposed on yarn because of this high speed.

By increasing the number of feeder:

If the number of feeder is increased in the circumference of cylinder, then the number of courses will be increased in one revolution at a time.

By using machine of higher gauge:

The more the machine gauge, the more the production is. So by using machine of higher gauge production can be increased.

By imposing other developments:

- Using creel-feeding system.
- Applying yarn supply through plastic tube that eliminates the possibilities of yarn damage.
- Using yarn feed control device.
- Using auto lint removal.

PRODUCATION CALCULATION:

Production/shift in kg at 100% efficiency

$$= \frac{RPM \times No.of\ Feeder \times No.of\ Needle \times SL(mm)}{3527.80 \times Yarn\,count}$$

Production/shift in meter

$$= \frac{Course/\min.}{Course/cm}$$
$$= \frac{RPM \times No.of\ Feeder \times 60 \times 12 \times Efficiency}{Course/cm \times 100}$$

Fabric width in meter:

$$= \frac{Total\,no.of\ wales}{Wales/cm \times 100}$$
$$= \frac{Total\,no.of\ Needles\,used\,in\,knitting}{Wales/cm \times 100}$$

MACHINE PRODUCATION:

Machine Name	Number of machine	Production per shift(kg)
S/J Machine (Pai-lung)	**09**	**2.5 Ton.**
Rib Machine (Pai-lung)	**07**	**1.9 Ton.**
Interlock Machine (Terret & Orizo)	**08**	**1.8 Ton.**

SOME POINTS ARE NEEDED TO MAINTAIN FOR HIGH QUALITY FABRIC:

- Brought good quality yarn.
- Machines are oiled and greased accordingly.
- G.S.M, Stitch length, Tensions are controlled accurately.
- Machines are cleaned every shift and servicing is done after a month.
- Grey Fabrics are checked by 4 point grading system

CHANGING GSM:

Major control by QAP pulley. Minor control by stitch length adjustment. Altering the position of the tension pulley changes the G.S.M. of the fabric. If pulley moves towards the positive direction then the G.S.M. is decrease. And in the reverse direction G.S.M will increase.

RELATIONSHIP BETWEEN KNITTING PARAMETER:

Stitch length increase with decrease of GSM. If stitch length increase then fabric width increase and Wales per inch decrease. If machine gauge increase then fabric width decrease. If yarn count increase (courser) then fabric width increase. If shrinkage increases then fabric width decrease but GSM and Wales per inch increase. For finer gauge, finer count yarn should us

CONSIDERABLE POINTS TO PRODUCE KNITTED FABRICS:

When a buyer orders for fabric then they mention some points related to production and quality. Before production of knitted fabric, these factors are needed to consider.

Those are as follows-

- Type of Fabric or design of Fabric.
- Finished G.S.M.
- Yarn count
- Types of yarn (combed or carded)
- Diameter of the fabric.
- Stitch length
- Color depth.

Effect of stitch length on color depth:

If the depth of color of the fabric is high loop length should be higher because in case of fabric with higher loop length is less compact. In dark shade dye take up% is high so GSM is adjusted then. Similarly in case of light shade loop length should be relatively smaller.

Factors that should be change in case of fabric design on quality change:

- Cam setting
- Set of needle
- Size of loop shape

FAULTS & THEIR CAUSES IN KNITTING:

Hole Mark:

Causes:

- Holes are the results of yarn breakage or yarn cracks.
- During loop formation the yarn breaks in the rejoin of the needle hook.
- If the yarn count is not correct on regarding structure, gauge, course and density.
- Badly knot or splicing.

- Yarn feeder badly set.

Remedies:

- Yarn strength must be sufficient to withstand the stretch as well as uniform.
- Use proper count of yarn.
- Correctly set of yarn feeder.
- Knot should be given properly.

Needle Mark:

Causes:

- When a needle breaks down then needle mark comes along the fabrics.
- If a needle or needle hook is slightly bends then needle mark comes on the fabrics.

Remedies:

- Needle should be straight as well as from broken latch.

Sinker Mark:

Causes:

- When sinkers corrode due to abrasion then sometimes cannot hold a new loop as a result sinker mark comes.
- If sinker head bend then sinker mark comes.

Remedies:

- Sinker should be changed.

Star Mark:

Causes:

- Yarn tension variation during production.
- Buckling of the needle latch.

- Low G.S.M fabric production.

Remedies:

- Maintain same Yarn tension during production.
- Use good conditioned needles.

Drop Stitches:

Causes:

- Defective needle.
- If yarn is not properly fed during loop formation i.e. not properly laid on to the needle hook.
- Take-down mechanism too loose.
- Insufficient yarn tension.
- Badly set yarn feeder.

Remedies:

- Needle should be straight & well.
- Proper feeding of yarn during loop formation.
- Correct take up of the fabric & correct fabric tension.
- Yarn tension should be properly.

Oil stain:

Causes:

- When oil lick through the needle trick then it pass on the fabrics and make a line.

Remedies:

- Ensure that oil does not pass on the fabrics.
- Well maintenance as well as proper oiling.

Rust stain:

Causes:

- If any rust on the machine parts.

Remedies:

- If any rust on the machine parts then clean it.
- Proper maintenance as well as proper oiling.

Pin hole:

Causes:

- Due to break down or bend of the latch, pin hole may come in the fabric.

Remedies:

- Change the needle.

Grease stain:

Causes:

- Improper greasing
- Excess greasing

Remedies:

- Proper greasing as well as proper maintenance

Cloth fall- out:

Causes:

- Cloth fall- out can occur after a drop stitch especially when an empty needle with an empty needle with closed latch runs into the yarn feeder and remove the yarn out of the hook of the following needles.

Remedies:

- Make sure all the latches of needle are closed with feeding yarn after a drop stitch.

Barre:

A fault in weft knitted fabric appearing as light or dark course wise (width wise) stripe(s).

Causes:

- This fault comes from yarn fault.
- If different micro near value of fiber content in yarn.
- Different luster, dye affinity of fiber content in yarn.

Remedies:

- We can use this fabric in white color.

Fly:

Report

On

Industrial Internship

Niagara Textiles Ltd.

Duration: Two months

Supervising Teacher

Engr. Ismat Zerin

Lecturer

Prepared By:

Md. Anowar Hossain

B.Sc. in Textile Engineering

(Major in wet Processing technology)

ID: 06313246

Batch: 4th

Semester: Summer-2010

Submission Date: 4th September, 2010

Department of Textile Engineering

40, kamal Ataturk Avenue

Banani, Dhaka-1213

Letter of transmittal

4th September, 2010

Engr. Ismat Zerin

Lecturer

Department of Textile Engineering,

City University,

Banani, Dhaka.

Subject: Submission of Internship report.

Dear Madam,

I am extremely indebted for your tremendous support and guidance throughout my long journey in City University and internship period. Being working with you I have not only earned valuable knowledge but also inspired by your innovativeness which helped to enrich my experience to a greater extent. **An internship report on "Wet Processing Technology" is submitted to you for the partial fulfillment of Bachelor of Science in Textile Engineering Degree.**

During my internship period, I have trained from all departments of Niagara textiles Ltd. But, I made sincere efforts to study related materials, observe operations performed in Knitting, Dyeing (Yarn & fabric), Garments, Effluent Treatment Plant & Water Treatment plant which are the sources of collected data to prepare the present report on Wet Processing Technology.

Within the time limit, I have to make this report as comprehensive as possible. But there may be some mistakes due to various limitations. For this reason, I beg your sympathetic consideration. Finally, I pray your blessing for my successful engineering career.

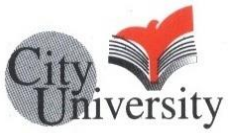
Thank you

Yours Faithfully

……

Md. Anowar Hossain

ID # 06313246



40, kamal Ataturk Avenue

Banani, Dhaka-1213

APPROVAL

This is to certify that Md. Anowar Hossain, BSTE program, 4th Batch, ID # 06313246 has successfully completed his Industrial Internship on Wet Processing Technology under my supervision. I do hereby approve his report. I also recommended to accept his report for partial fulfillment of Bachelor of Science in Textile Engineering (BSTE) Degree.

Supervisor:

Engr. Ismat Zerin

Lecturer

Department of Textile Engineering

City University

Reference:

Dr. Engr. Saiful Islam

Head, Department of Textile Engineering

City University

Declaration statement

This is to be declared that, this report is prepared by my own research and work. There is no plagiarism in this work. I used the perfect system for referencing. The report was not submitted earlier to any other course or any other institution.

I am responsible if any kinds of plagiarism are founded in this work.

A copy of this Internship report is retained for further reference.

_____

Md.Anowar Hossain

ID: 06313246

BSTE

Batch: 4th

AT A GALANCE

MY EXTRA ACHIEVMENT

Certified Training on Textile:

1. Spinning, weaving and Knitting
   National Institute of Textile training, Research and Design, **NITTRAD**
   Faculty of Niederrhein University, Germany.

2. Dyeing and Finishing
   National Institute of Textile training, Research and Design, **NITTRAD**
   Faculty of Niederrhein University, Germany

3. Merchandising
   National Institute of Textile training, Research and Design, **NITTRAD**

4. Costing of apparels and effective approaches to cost minimization & Merchandising.
   National Institute of Textile training, Research and Design, **NITTRAD**

5. Shipping procedures of Export and Import
   DCCI Business Institute(DBI),
   An Affiliate of ITC UNCTAD/WTO, Geneva.

6. Fire Safety Management
   Prothom Alo Jobs.

My Publications on textile:

1. **Basic Knowledge of wet Processing Technology**
2. **Garments technology for Merchandiser and Fashion Designer**
3. **Principles of Garments Production**

   Rupok Publications,
   140, Islamia Market,
   Nilkhet Dhaka-1205
   Mobile: 01719924877
   01919282527

DEDICATED TO

The Honourable Chairman-Board of Governors

City University

(AL-Haz Mokbul Hossain)

Who issued me an education loan from Sandhani Life Insurance company, without his unique opportunity it would be impossible to fulfill my dream of Textile Engineering.

ACKNOWLEDGEMENT TO CITY UNIVERSITY

I sincerely felicitate to **Dr. Engr. Saiful Islam, Senior Assistant Professor & Head, Department of Textile Engineering** for his cordial support and continuous guidance throughout my long journey in City University & Industrial Training.

I am giving special thanks all of my respected teacher of City University who are cordially helped me to achieve textile knowledge. Specially, My textile engineering knowledge is the reflection of following highly experienced teacher.

1. Dr. Engr. Saifur Rahman, Associate Professor
2. Dr. Arun kanti Guha, Assistant Professor
3. Engr. Rafiqur Rashid, Associate Professor
4. Engr. Rina Khanum, Assistant Profesor
5. Engr. Amirul Islam, Lecturer
6. Engr. Rokonuzzaman, Lecturer
7. Engr. Bithi Choudhury, Lecturer
8. Engr. Abdullahil Kafi, Lecturer
9. Engr. Rishad Riyaan, Lecturer

10. Engr. Jenifar Amman, Lecturer
11. Engr. Lutfur Rahman (Faruk), Lecturer
12. Engr. Sujit Shaha, Lecturer
13. Engr. Kamruzzaman, Lecturer
14. Engr. Azhar Ali, Lecturer
15. Engr. Arifuzzaman, Lecturer

First Batch, City University

ACKNOWLEDGEMENT TO NIAGARA TEXTILES LTD.

ACKNOWLEDGEMENT TO NIAGARA TEXTILES LTD.

I specially congratulate to **Engr. Md. Abraruzzaman Diamond, General Manager of Niagara textiles Ltd** for his permission to conduct my industrial Training without which it would be uncompleted.

I also sincerely thanks to the following personalities from which I have taken lots of support to prepare this industrial report during my Industrial Internship.

17. Engr. Abu Bakar Siddique, Dyeing Manager.
18. Engr. Toriqul Islam, Knitting Manager.
19. Engr. Saydur Rahman, Electrical Manager.
20. Engr. Zafor, Asst. Dyeing Manager
21. Engr. Monju Rahman, Senior Production Officer, Dyeing
22. Engr. Sohanur Rahman, Senior Production Officer, Dyeing
23. Engr. Khalid faisal, Production Officer, Dyeing
24. Engr. Arifur Rahman, Production Officer, Dyeing
25. Engr. Shimul kumar, Production Officer, Dyeing
26. Engr. Abdullah, Production Officer, Dyeing
27. Engr. Nazmul Shakib, R & D Officer
28. Engr. Asaduzzaman, Production Officer, Dyeing
29. Engr. Zafor Ahmed, Production Officer, Knitting
30. Engr. Monsi Abdus Salam, Production Officer, knitting
31. Engr. Mahfuz, First Batch, City University.
32. Engr. Mihir Ranjon Das, First Batch, City university

ACKNOWLEDGEMENT TO MY FAMILY

I extend heartiest congratulation to my precious family for their never ending love and inspire at every stages of my practical life.

1**. Father:** Dr. Md. Abdur Rashid

2. **Mother:** Sakera Begum

3. **Elder Brother:** Md. Sanowar Hossain

Md. Jahangir Hossain

4. **Elder Sister:** Rashida Begum

EXECUTIVE SUMMARY
0f
Niagara Textiles Ltd.

The internationally recognized Buyers or clients are looking for those countries for producing their apparel products where different types of mills have established as a one stop source for the global apparel market, satisfy and meet customer's expectation by developing and providing products and services on time, which offer value in terms of Quality, Price, Safety & Environmental impact. And also assure complete compliance with the international quality standards and also to provide the employees internationally acceptable working condition/standards. In Bangladesh, there are different types of Textile Industry those are producing high quality textile and apparel product. Niagara Textiles Ltd. is one of them. Niagara Textiles Ltd. is A France-Bangladesh joint venture limited company with Composite Knit Garments Manufacturer & Exporter, having all state of the art facilities with annual turnover Tk. 10, 00, 00,000 to 12, 00, 00,000. They have Different types of knitting, Dyeing, Cutting, Sewing, and Finishing machines supplied by mostly Japan, Taiwan, U.K, USA, Turkey etc. which are very latest. It has high production where 18 tons of dyed and finished fabrics are produced per day. The production is controlled by technical persons. All of the decision makers of production sector in Niagara Textiles Ltd. are textiles graduates. All the chemicals and dyes use for dyeing and finishing are well branded. They produce their product for their buyer and client those are coming from international market like U.K, Ireland, France, Germany, Belgium, and Spain. They follow all the system for their machines maintenance so production can not hamper.

In this report, I have tried to give some information about Niagara Textiles Ltd. and I have observed that Niagara Textiles Ltd. produce high quality fabric and fulfill the special requirements from the different types of buyers by following different internationally recommended standard method.

TABLE OF CONTENTS

List of Tables

Causes:

- In knitting section too much lint is flying to and fro that are created from yarn due to low twist as well as yarn friction. This lint may adhere or attaches to the fabric surface tightly during knit fabric production.

Remedies:

- Blowing air for cleaning and different parts after a certain period of time.
- By cleaning the floor continuously.
- By using ducting system for cleaning too much lint in the floor.

Yarn contamination:

Causes:

- If yarn contains foreign fiber then it remains in the fabric even after finishing,
- If lot, count mixing occurs.

Remedies:

- By avoiding lot, count mixing.
- Faultless spinning.

.

Yarn Faults:

- Neps.
- Slubs.
- Yarn count.
- Thick/Thin place in yarn.
- Hairiness.

BATCHING

BATCHING:

Batching is the process to get ready the fabrics that should be dyed and processed for a Particular lot of a Particular order.

BATCH MANAGEMENT:

Primarily Batching is done by dyeing manager taking the above criteria under consideration. Batch section in charge receives this primary batch plan from dyeing Manager. Some time Planning is adjusted according to m/c condition.

BATCH PROCESS FOLLOW UP:

Grey fabric inspection

↓

Batching

↓

Fabric Turning

Storing for dyeing

PURPOSE OF BATCH SECTION:

- To receive the grey fabrics roll from knitting section or other source.
- To turn out the tubular fabric in its grey stage and to safe the face side of the fabric from any type of friction during the time of dyeing.
- To prepare the batch of fabric for dyeing according to the following criteria-
- Order sheet (Receive from buyer)
- Dyeing shade (Color or white, light or Dark)
- M/c available
- Type of fabrics (100% cotton, PC, CVC)
- Emergency
- To send the grey fabric to the dyeing floor with batch card.
- To keep records for every previous dyeing.

CRITERIA OF PROPER BATCHING:

- To use maximum capacity of existing dyeing m/c.
- To minimize the washing time or preparation time & m/c stoppage time.
- To keep the no. of batch as less as possible for same shade.
- To use a particular m/c for dyeing same shade.

FABRIC FAULTS IDENTIFICATION:

Hole Mark:

- Holes are the results of yarn breakage or yarn cracks.
- During loop formation the yarn breaks in the rejoin of the needle hook.
- Badly knot or splicing.
- Yarn feeder badly set.
- Yarn strength must be sufficient to withstand the stretch as well as uniform.
- Use proper count of yarn.

Needle Mark:

- When a needle breaks down then needle mark comes along the fabrics.
- If a needle or needle hook is slightly bends then needle mark comes on the fabrics.
- Needle should be straight as well as from broken latch.

Sinker Mark:

- When sinkers corrode due to abrasion then sometimes cannot hold a new loop as a result sinker mark comes.
- If sinker head bend then sinker mark comes.
- Sinker should be changed.

Star Mark:

- Yarn tension variation during production.
- Low G.S.M fabric production.
- Maintain same Yarn tension during production.
- Use good conditioned needles.

Drop Stitches:

- Defective needle.

- If yarn is not properly fed during loop formation i.e. not properly laid on to the needle hook.
- Take-down mechanism too loose.
- Needle should be straight & well.
- Proper feeding of yarn during loop formation.

DYEING DEPARTMENT

DEFINITION OF DYEING:

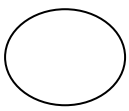
Dyeing is the process of imparting colors to a textile material in loose fiber, yarn, cloth or garment form by treatment with dye.

SCOURING:

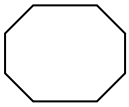
Scouring is a process of removing the impurities from the fiber to produce hydrophilic and clean fabric which accelerate the absorbency.

HOW TO CHECK SCOURING SAMPLE:

1. When small amount of fabric is applied on the Dry scouring fabric and looked as below i.e. 100% scouring fabric



2. When small amount of fabric is applied on the Dry scouring fabric and looked as below i.e. 50% scouring fabric.



STABILIZER:

It helps to proper utilize of Hydrogen Peroxide

Normally, Hydrogen Peroxide reacts with water and produced jayman oxygen

If stabilizer is not used, jayman oxygen produced quickly and dyeing fault may occur.

ENZYME:

Break down the hemi-cellulose

DETERGENT:

One kind of wetting agent.

ANTICREASING AGENT:

It works like as Lubricant

LEVELLING AGENT:

To remove aggressive of color in single place

SEQUESTERING AGENT:

To remove hardness

WORKING FLOW CHART OF DYEING:

Demineralization

↓

Scouring & bleaching

↓

(Wetting agent, sequestering agent, anti creasing agent, anti foaming agent, alkali, stabilizing agent, hydrogen per oxide) or multi functional scouring agent.

Per oxide hot with a/acid

↓

Enzymes wash with a/acid

↓

Leveling with sequestering

↓

Salt dosing

↓

Dye dosing

↓

Soda dosing

↓

Sample

↓

Drain

↓

Washing off

↓

A/acid

↓

Softener

↓

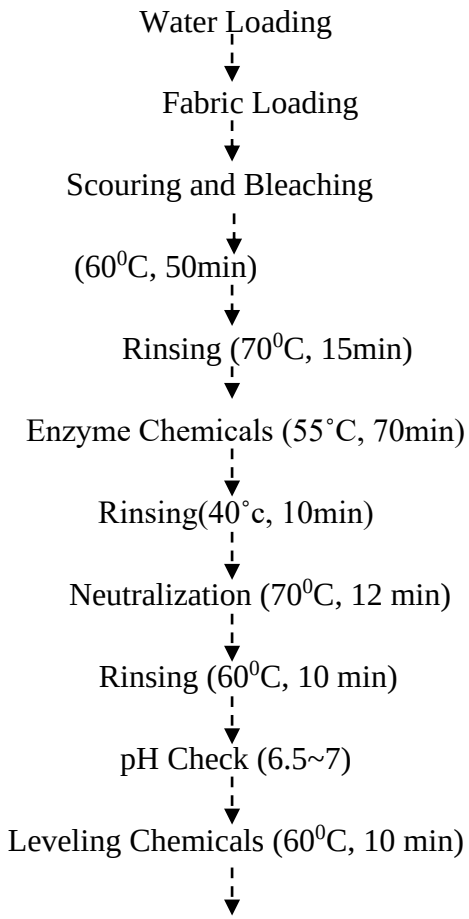
Unload

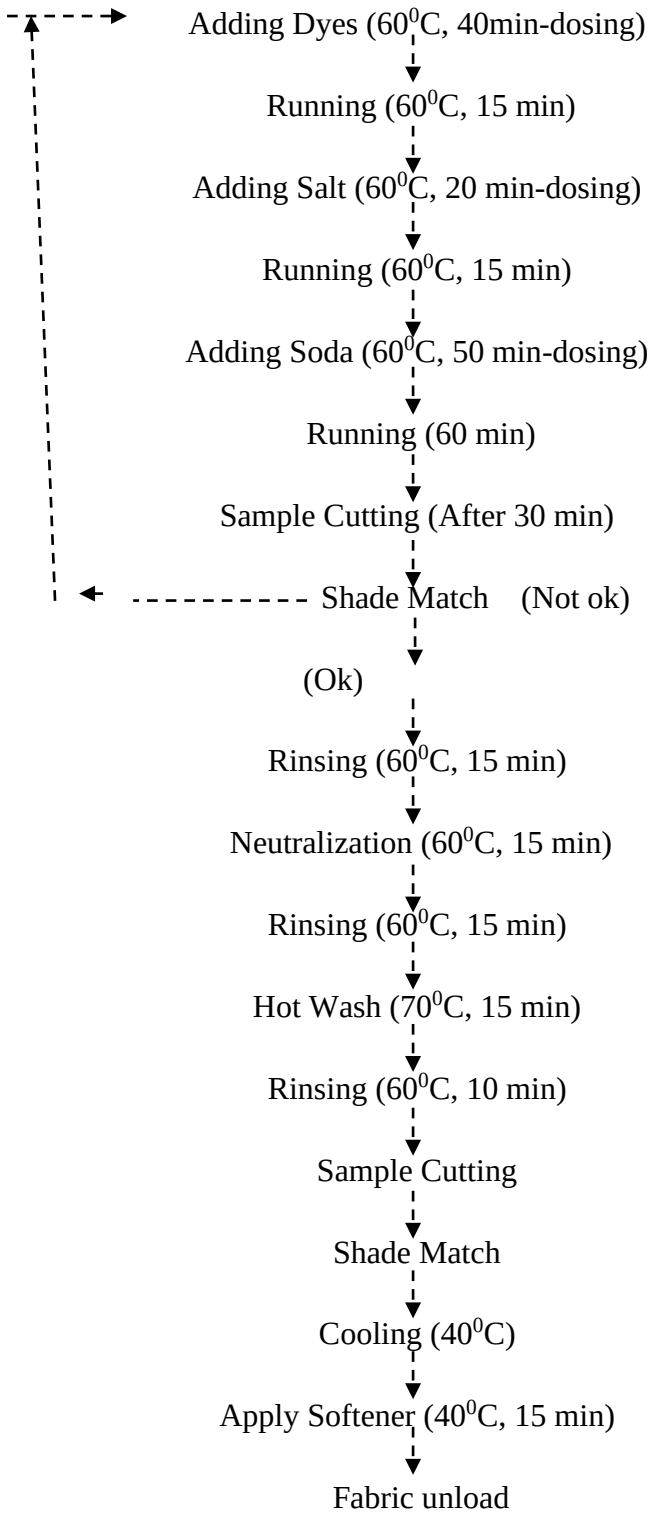
LIST OF MACHINE IN DYEING SECTION:

M/C No.	Machine Name	Temperature	Production capacity	Origin
	Sample	Dyeing M/C		
1	PMM	120˚C	25Kgs	Turkey
2	PMM	120˚C	25Kgs	Turkey
3	Dilmenler	125˚C	50Kgs	Turkey
4	PMM	120˚C	25Kgs	Turkey
5	Acme	125˚C	50Kgs	Taiwan
6	PMM	120˚C	25Kgs	Turkey
7	Bangla	100˚C	10Kgs	Bangladesh
8	Bangla	100˚C	10Kgs	Bangladesh
	Dyeing	M/C		
1	PMM	120˚C	200Kgs	Turkey
2	PMM	120˚C	300Kgs	Turkey
3	PMM	120˚C	400Kgs	Turkey

4	**PMM**	**120˚C**	**600Kgs**	**Turkey**
5	**PMM**	**120˚C**	**800Kgs**	**Turkey**
6	**Acme**	**135˚C**	**600Kgs**	**Taiwan**
7	**PMM**	**130˚C**	**750Kgs**	**Turkey**
8	**PMM**	**130˚C**	**300Kgs**	**Turkey**
9	**PMM**	**120˚C**	**100Kgs**	**Turkey**
10	**Dilmenler**	**135˚C**	**150Kgs**	**Turkey**
11	**Dilmenler**	**135˚C**	**300Kgs**	**Turkey**
12	**Dilmenler**	**135˚C**	**450Kgs**	**Turkey**
13	**Acme**	**135˚C**	**1200Kgs**	**Taiwan**
14	**Acme**	**135˚C**	**1500Kgs**	**Taiwan**
15	**Acme**	**135˚C**	**1200Kgs**	**Taiwan**

PROCESS FLOW CHART FOR COTTON DYEING (LIGHT SHADE WITH COLD BRAND REACTIVE DYES):





Recipe for Cotton Dyeing (Light Shade):

Colour: Ecru **M: L -1:10**

Recipe for Scouring & Bleaching

Felosan NOF (Wetting agent &Detergent)	: 0.5 g/l
Invatex CS (Sequestering Agent)	: 0.4 g/l 98^0C X40min X 30 min
Ciba Fluid C (Anti-creasing Agent)	: 0.5 g/l
Gemstap-HP 52 (Stabilizer)	: 0.6 g/l
Caustic Soda (Alkali)	: 3.0 g/l
Hydrogen per Oxide (Bleaching Agent)	: 3.5 g/l
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l

Recipe Enzyme Treatment

Felosan NOF (Wetting agent &Detergent)	: 0.5 g/l	
Platilon 2900 (Acid) 50min; 70^0C X 12min	: 1.5 g/l	50^0C X
Retrocell PLX (Enzyme)	: 1.2 g/l	

Recipe for Neutralization

Meropan BRE (Per-Oxide Killer) min X10 min	: 1.0 g/l	70^0C X 12
Platilon 2900 (Acid)	: 1.5 g/l	

Recipe for Dyeing

Cibacell DBC (Leveling Agent)	: 1.5 g/l	
Ciba Fluid C (Anti-creasing Agent)	: 0.2 g/l	60^0C X10 min
Cibaflow JET (Anti-foaming agent)	: 0.05 g/l	

Dyes

Ciba: Yellow FN2R	: 0.0035% (owf)	
Ciba: Red RNR	: 0.0005 %(owf)	60^0C X 40min-dosing
Ciba: Blue FNR	: 0.0002% (owf)	

Salts and Alkali

Glauber salt (Na_2SO_4)	: 10.0 g/l	Salt-60^0C X 20 min-
Soda ash (Na_2CO_3)	: 10.0 g/	dosing & 15 min- Running;
		Alkali-60^0C X50 min-dosing & 60 min-Running

Recipe for Neutralization

Platilon 2900 (Acid)	: 1.0 g/60^0C X15 min X15 min	

Recipe for Hot Wash

Cibapon R (Wash-off Chemicals)	: 0.5 g/l	70^0C X15 min X 10 min

Recipe for Softening

Alkamine CWS	: 3.0 g/l	40^0C X 15 min
Platilon 2900 (Acid)	: 0.1 g/l	

PROCESS FLOW CHART FOR COTTON DYEING (DARK SHADE WITH HOT BRAND REACTIVE DYES):

Water Loading

↓

Fabric Loading

↓

Scouring and Bleaching Chemicals (98^0C, 40min)

↓

Rinsing (95^0C, 20 min); (80^0C, 10 min) ;(70^0C, 5min)

↓

Neutralization (70^0C, 12 min)

↓

Rinsing (60^0C, 10 min)

↓

pH Check (6.5~7)

↓

Leveling Chemicals (80^0C, 10

↓

Adding Salt (80^0C, Transfer)

↓

Running (80^0C, 15 min)

↓

Adding Dyes (80^0C, 40 min-dosing)

↓

Running (80^0C, 20 min)

↓

Adding Alkali (80^0C, 50 min-dosing)

↓

Running (60 min)

↓

Sample Cutting (After 30 min)

↓

Shade Match (Ok)

↓

Rinsing (80^0C, 10 min)

↓

Rinsing (60^0C, 5 min)

↓

Neutralization (60^0C, 10 min)

↓

Rinsing (60^0C, 10 min)

↓

Hot Wash (85^0C, 30 min)

↓

Rinsing (80^0C, 30 min)

↓

Temperature down (60^0C)

↓

Sample Cutting

↓

Shade Match

↓

Fixing Chemicals (50^0C X 15 min)

↓

Cooling (40^0C)

↓

Apply Softener (40^0C, 15 min)

↓

Fabric unload

Remarks: Enzyme is done according to the buyer's requirement

Recipe for Cotton Dyeing (Dark Shade with Hot Brand Reactive Dyes) :(Without Enzyme Treatment)

Colour: Dark Red **M:L -1:10**

Recipe for Scouring & Bleaching

Combijet HK conc. (Wetting agent &Detergent) : 1.3 g/l

Invatex CS (Sequestering Agent) : 0.4 g/l

Caustic Soda (Alkali) : 3.0 g/l | 98^0C X 40min X 35 min

Hydrogen per Oxide (Bleaching Agent) : 3.5 g/l

Cibaflow JET (Anti-foaming agent) : 0.1 g/l

Recipe for Neutralization

Meropan BRE (Per-Oxide Killer) : 1.0 g/l | 70^0C X 12 min X 10 min

Platilon 2900 (Acid) : 1.5 g/l

Recipe for Dyeing

Cibacell DBC (Leveling Agent) : 1.3 g/l

Gemsol LCR-200 (Anti-creasing Agent) : 0.3 g/l | 80^0C X 10 min

Cibaflow JET (Anti-foaming agent) : 0.05 g/l

Dyes

Ciba: Red HB : 4.25% (owf) | 80^0C X 40 min-dosing

Ciba: Yellow HR : 0.62 % (owf) | & 20 min-running

Salts and Alkali

Glauber salt (Na_2SO_4) Transfer & 15	: 80.0 g/l	Salt -80^{0}C,
Soda ash (Na_2CO_3) Alkali-80^{0}C	: 8.0 g/l	min –Running;
Caustic Soda dosing; Run-60 min	: 1.6 g/l	X 50 min-

Recipe for Neutralization

Platilon 2900 (Acid) X 10 min	: 1.2 g/l	60^{0}C X 10 min

Recipe for Hot Wash

Cibapon R (Wash-off Chemicals) 30 min	: 1.0 g/l	85^{0}C X 30 min X

Recipe for Fixing Chemical

Gemfix FDR (Fixing Chemical) min	: 1.0 g/l	50^{0}C X 15

Recipe for Softening

Alkamine CWS min	: 3.0 g/l	40^{0}C X 15
Platilon 2900 (Acid)	: 0.1 g/l	

PROCESS FLOW CHART FOR COTTON DYEING (WHITE COLOR)

Water Loading

↓

Fabric Loading

↓

Enzyme Chemicals (50^{0}C, 50min) ;(70^{0}C, 12min)

↓

Rinsing (70^0C, 20min)

↓

(Add At 60^0C) Scouring and Bleaching Chemicals and Optical Brightener (98^0C, 40min)

↓

Rinsing (95^0C, 20 min); (80^0C, 10 min) ;(70^0C, 5min)

↓

Neutralization (60^0C, 12 min)

↓

Rinsing (40^0C, 10 min)

↓

Sample Cutting (After 30 min)

↓

Shade Match

↓

Sample Cutting

↓

Shade Match

↓

Apply Softener (40^0C, 15 min)

↓

Fabric unload

Recipe for Cotton Dyeing (White colour)

Colour: White **M: L -1:8**

Recipe Enzyme Treatment

Felosan NOF (Wetting agent &Detergent) : 0.5 g/l

Platilon 2900 (Acid)	: 1.2 g/l	50^0C X 50min; 70^0C X 12min
Retrocell PLX (Enzyme)	: 1.5 g/l	

Recipe for Scouring & Bleaching

Felosan NOF (Wetting agent &Detergent)	: 0.5 g/l	
Invatex CS (Sequestering Agent)	: 0.5 g/l	
Gemsol LCR-200 (Anti-creasing Agent)	: 0.5 g/l	
Gemstap-HP 52 (Stabilizer)	: 0.8 g/l	98^0C X 40min X 30 min
Caustic Soda (Alkali)	: 4.0 g/l	
Hydrogen per Oxide (Bleaching Agent)	:10.0 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l	

Recipe for Dyeing

Optical Brightener

Syno White 4BK	: 0.8% (owf)	60^0C (Apply with Scouring
Syno White BYB	: 0.2 % (owf)	Chemicals)

Recipe for Neutralization

Platilon 2900 (Acid)	: 1.0 g/l	60^0C X15 min X10 min

Recipe for Softening

Tubingal 1112	: 2.0 g/l	40^0C X 15 min

PROCESS FLOW CHART FOR VISCOSE DYEING (BLACK COLOR):

Water Loading

↓

Machine start

↓

Fabric Loading

↓

Detergent Dosing

↓

Viscose Pretreatment Chemical dosing

(Temperature-60^0C & Run Time-60 min)

↓

Black color dosing

(Temperature-40^0C & Time-10 min)

↓

Soda ash dosing

(Temperature-40^0C & Time-10 min)

↓

Steam-up

(Temperature-60^0C & Time-60 min)

↓

Shade check

↓

Draining

↓

Acid dosing

↓

Hot wash with Alvatex-S (powder)

(Temperature-100^{0}C & Run Time-10 min)

↓

Softner dosing

↓

Fabric Unloading

RECIPE FOR VISCOSE DYEING (BLACK BERRY):

Recipe for Demineralization:

Detergent (Cotmoll DN-NT):	**0.20 g/l**	
Sequestering Agent (Alvatex CH-10):	**0.40 g/l**	60^{0}C X20min
Anticreasing Agent (Novolube JET):	**0.50 g/l**	

Recipe for Pretreatment (Scouring & Bleaching):

Detergent (Cotmoll DN-NT):	**0.40 g/l**	
Sequestering Agent (Alvatex CH-10):	**0.50 g/l**	
Anticreasing Agent (Novolube JET):	**1.00 g/l**	98^{0}C X70min
Alkali (Caustic Soda):	**1.70 g/l**	
Stabilizer (AlvatexHOS):	**0.30 g/l**	
Bleaching Agent (Hydrogen Peroxide):	**2.10 g/l**	

Recipe for Neutralization & Peroxide kill:

Peroxide Killer (Biozyme Ultra APL):	**0.30 g/l**	

Recipe for Enzyme Treatment:

Acid (Nuta acid): **1.00 g/l**

Enzyme (Biozyme ECX): **50%**

Recipe for Dyeing:

Levelling Agent (Serago CFTR): **1.00 g/l**

Anticreasing Agent (Novolube JET): **0.50 g/l**

Remazol Yellow RR: **0.692000%**

Remazol Red RR: **0.473000%**

Remazol Blue RR: **0.518000%**

Electrolyte (glauber Salt): **50.00 g/l**

Alkali (Soda Ash): **10.00 g/l**

Recipe for Neutralization & Soaping:

Acid (Nuta acid): **0.25 g/l**

Washing off Agent (AlvatexS-Powder): **0.25 g/l**

Recipe for After Treatment:

Acid (Core neutralizer): **0.35 g/l**

Softner (Alvatex-ETG): **0.75%**

PROCESS FLOW CHART FOR POLYESTER DYEING (LIGHT SHADE)

Water Loading

↓

Fabric Loading

↓

Scouring Chemicals (98^0C, 40min)

↓

Rinsing (95^0C, 30 min); (80^0C, 10 min) ;(60^0C, 5min)

↓

Neutralization (60^0C, 12 min)

↓

Rinsing (60^0C, 15 min)

↓

Leveling Chemicals (60^0C, 10 min)

↓

pH Check (4.5~4.8)

↓

(80^0C-mixing) Adding Dyes (60^0C, 15 min-dosing)

↓

Running (60^0C, 10 min)

↓

Temperature Rise (60^0C to 95^0C, 1.5-Gradient)

↓

Temperature Rise (95^0C to 130^0C, 1.0-Gradient)

↓

Hold Time (40 min)

↓

CoolDown (130^0C to 95^0C, 1.0-Gradient)

↓

CoolDown (95^0C to 80^0C, 1.5-Gradient)

↓

Sample Cutting

↓

Shade Match (Ok)

↓

Rinsing (Until Water Clean)

↓

Reduction Clearing (80^0C, 30-min)

↓

Rinsing (80^0C, 30-min)

↓

Reduction Clearing (80^0C, 30-min)

↓

Rinsing (80^0C, 30-min)

↓

Cooling (80^0C to 60^0C, 1.0-Gradient)

↓

Neutralization (60^0C, 10 min)

↓

Rinsing (60^0C, 10 min)

↓

Hot Wash (70^0C, 15 min)

↓

Rinsing (60^0C, 10 min)

↓

Temperature down (60^0C-40 ^{0}C)

↓

Sample Cutting

↓

Shade Match

↓

Apply Softener (40^0C, 10min)

↓

Fabric unload

Recipe for Polyester Dyeing (Light Shade)

Colour: Light blue **M: L -1:10**

Recipe for Scouring

Tinovetin TC (Wetting agent &Detergent)	: 1.0 g/l	
Invatex CS (Sequestering Agent)	: 0.6 g/l	
Gemsol LCR-200 (Anti-creasing Agent)	: 0.5 g/l	98^0C X 40min X 30 min
Caustic Soda (Alkali)	: 4.0 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l	

Recipe for Neutralization

Platilon 2900 (Acid)	: 1.0 g/l	70^0C X 12 min X10 min

Recipe for Dyeing

Cibatex AB-45 (Leveling Agent)	: 1.2 g/l	
Univadine DP (Leveling Agent)	: 1.2 g/l	60^0C X10 min
Gemsol LCR-200 (Anti-creasing Agent)	: 0.2 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.05 g/l	

Dyes

Bema: Turquise SGE	: 0.22%	60^0C X 15min-dosing
Bema: Blue HPSR	: 0.021 %	X 10min-Hold Time
Tera: Red FBN	: 0.0014%	

Recipe for Reduction Clearing

Hydrose min X 30min	: 4.0 g/l	80^0C X 30
Caustic Soda (Alkali)	: 4.0 g/l	

Recipe for Reduction Clearing

Hydrose min X 30min	: 3.0 g/l	80^0C X 30
Caustic Soda (Alkali)	: 3.0 g/l	

Recipe for Neutralization:

Platilon 2900 (Acid) min X15 min	: 1.0 g/l	60^0C X15

Recipe for Hot Wash

Merapon RED (Wash-off Chemicals) min	: 0.5 g/l	70^0C X15 min X 10

Recipe for Softening

Arristan PSR min	: 3.0 g/l	40^0C X 15
Platilon 2900 (Acid)	:1.2g/l	

PROCESS FLOW CHART OF P/C BLEND FABRICS (65/35)

Polyester Part Dyeing:

Water Loading

Fabric Loading

↓

Scouring Chemicals (98^0C, 40min)

↓

Rinsing (95^0C, 30 min); (80^0C, 10 min) ;(60^0C, 10min)

↓

Neutralization (70^0C, 10 min)

↓

Rinsing (60^0C, 10 min)

↓

pH Check(6.5~ 6.8)

↓

Leveling Chemicals (60^0C, 10 min)

↓

pH Check(4.5~4.7)

↓

(80^0C-mixing) Adding Dyes (60^0C, 15 min-dosing)

↓

Running (60^0C, 10 min)

↓

Temperature Rise (60^0C to 90^0C, 2.0Gradient)

↓

Temperature Rise (90^0C to 130^0C, 1.5-Gradient)

↓

Hold Time (130^0C, 40 min)

↓

CoolDown (130^0C to 90^0C, 1.5-Gradient)

↓

CoolDown (90^0C to 80^0C, 2.0-Gradient)

↓

Sample Cutting

↓

Shade Match (Ok)

↓

Rinsing (80^0C, 30-min)

↓

Reduction Clearing (80^0C, 30-min)

↓

Rinsing (80^0C, 30-min)

↓

Reduction Clearing (80^0C, 30-min)

↓

Rinsing (80^0C, 30-min)

↓

CoolDown (80^0C to 60^0C, 1.0-Gradient)

↓

Neutralization (60^0C, 10 min)

↓

Rinsing (Until Water Clean)

↓

Then Proceed For Cotton Part

Cotton Part dyeing:

After the Process of Polyester Part

↓

pH Check(6.5~ 6.8)

↓

Leveling Chemicals (60^0C, 10 min)

↓

Adding Salt (60^0C, Transfer)

↓

Running (60^0C, 10 min)

↓

Adding Dyes (60^0C, 35min-dosing)

↓

Running (60^0C, 20 min)

↓

Adding Alkali (60^0C, 45 min-dosing)

↓

Running (60 min)

↓

Sample Cutting (After 30 min)

↓

Shade Match (Ok)

↓

Rinsing (60^0C, 20 min)

↓

Neutralization (60^0C, 10 min)

↓

Rinsing (60^0C, 10 min)

↓

Hot Wash (90^0C, 20 min)

↓

Rinsing (90^0C, 20 min)

↓

Temperature down (90^0C-70^0C)

↓

Sample Cutting

↓

Shade Match (Ok)

↓

Temperature Down (70^0C-40^0C)

↓

Apply Softener (40^0C, 15 min)

↓

Fabric unload

Recipe for Dyeing of P/C Blend Fabric (65/35):

Polyester Part:

Recipe for Polyester Dyeing:

Colour: Black **M:L -1:10**

Recipe for Scouring

Combijit HK Conc. (Wetting, Detergent & Sequestering Agent)	: 1.0 g/l	
Gemsol LCR-200 (Anti-creasing Agent)	: 0.5 g/l	98^0C X 40min
Caustic Soda (Alkali)	: 3.0 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l	

X 30 min

Recipe for Neutralization

Platilon 2900 (Acid)	: 1.0 g/l	70^0C X 10 min

X10 min

Recipe for Dyeing

Cibatex AB-45 (Leveling Agent)	: 1.2 g/l	
Univadine DP (Leveling Agent)	: 1.2 g/l	60^0C X10 min
Ciba Fluid C (Anti-creasing Agent)	: 0.2 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.05 g/l	

Dyes

Tera: Black SRL	: 5.05% (owf)	
Tera: Red W4BS	: 0.596 %(owf)	60^0C X
Tera: Golden Yellow	: 0.098% (owf)	X 10min-
Tera: Navy W-RS	: 0.854% (owf)	

15min-dosing

Hold Time

Recipe for Reduction Clearing:

Hydrose X 30min	: 2.0 g/l	80^0C X 30 min
Caustic Soda (Alkali)	: 2.0 g/l	

Recipe for Reduction Clearing:

Hydrose min X 30min	: 2.0 g/l	80^0C X 30
Caustic Soda (Alkali)	: 2.0 g/l	

Recipe for Neutralization:

Platilon 2900 (Acid) min X10 min	: 1.0 g/l	60^0C X10

Cotton Part

Recipe for Cotton Dyeing:

Colour: Black **M: L -1:10**

Recipe for Dyeing:

Cibacell DBC (Leveling Agent)	: 1.5 g/l	
Meropan DPE (Leveling Agent)	: 0.5 g/l	60^0C X10 min
Ciba Fluid C (Anti-creasing Agent)	: 0.3g/l	
Cibaflow JET (Anti-foaming agent)	: 0.05 g/l	

Dyes

Ever: Black GRI	: 1.28% (owf)	
Ever: Black B 35min-dosing	: 0.7 % (owf)	60^0C X
Ever: Red 3BS times	: 0.294% (owf)	20 min-Hold

Salts and Alkali

Glauber salt (Na_2SO_4) Running;	: 50.0 g/l	Salt-60^0C X 10 min-
Soda ash (Na_2CO_3) min-dosing	: 12.0 g/l	Alkali-60^0C X45
		& 60 min-
Running		

Recipe for Neutralization

Platilon 2900 (Acid) X10 min	: 1.0 g/l	60^0C X10 min

Recipe for Hot Wash

Cibapon R (Wash-off Chemicals) X 20 min	: 1.0 g/l	90^0C X20 min

Recipe for Softening:

Alkamine CWS min	: 2.0 g/l	40^0C X 15
Platilon 2900 (Acid)	: 0.1 g/l	

PROCESS FLOW CHART FOR DYEING OF TACTEL FABRIC :(NYLON):

Water Loading

Fabric Loading

↓

Scouring Chemicals (98^0C, 40min)

↓

Rinsing (95^0C, 20 min); (80^0C, 10 min) ;(70^0C, 5min)

↓

Neutralization (60^0C, 15 min)

↓

Rinsing (60^0C, 10 min)

↓

pH Check (6.5~7)

↓

Leveling Chemicals (60^0C, 15 min)

↓

Adding Dyes (95^0C, 50min-dosing)

↓

Running (95^0C, 15 min)

↓

Temperature Rise (95^0C to 110^0C, 1.0-Gradient)

↓

Hold Time (40 min)

↓

CoolDown (110^0C to 95^0C, 1.5-Gradient)

↓

CoolDown (95^0C to 80^0C, 1.0-Gradient)

↓

Sample Cutting (After 30 min)

↓

Shade Match (Ok)

↓

Rinsing (80^0C, 10 min) ;(70^0C, 15 min) ;(60^0C, 10 min)

↓

Fixing and Neutralizing (80^0C, 20 min);

↓

Rinsing (80^0C, 20 min) ;(70^0C, 15 min);

↓

Hot Wash (80^0C, 20 min)

↓

Rinsing (80^0C, 20 min)

↓

Sample Cutting

↓

Shade Match

↓

Cooling (40^0C)

↓

Apply Softener (40^0C, 10 min)

↓

Fabric unload

Recipe for Dyeing of Tactel Fabric (Nylon):

Colour: Pink M:L -1:10

Recipe for Scouring

Tinovetin TC (Wetting agent &Detergent)	: 1.0 g/l	
Invatex CS (Sequestering Agent)	: 0.5 g/l	
Gemsol LCR-200 (Anti-creasing Agent)	: 0.5 g/l	98^0C X 40min X 35 min
Soda Ash (Alkali)	: 3.5 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l	

Recipe for Neutralization

Platilon 2900 (Acid)	: 1.2 g/l	60^0C X 15 min X10 min

Recipe for Dyeing

Albegal SET (Wetting and Soaping Agent)	: 1.2 g/l	
Sodium Acetate (Buffer Agent)	: 1.2 g/l	
Platilon 2900 (Acid)	: 0.85 g/l	60^0C X15 min
Gemsol LCR-200 (Anti-creasing Agent)	: 0.2 g/l	
Cibaflow JET (Anti-foaming agent)	: 0.1g/l	

Dyes		110^0C X 50min-dosing
Eric: Red A2BF	: 0.0035 %(owf)	X 15min – Running

Eric: Blue AR Hold time	: 0.008 %(owf)	X 40 min-

Recipe for Fixing and Neutralization

Cibatex RN (Wash-off Chemicals) min X 20 min	: 1.5 g/l	80^0C X20
Platilon 2900 (Acid)	: 1.0 g/l	

Recipe for Hot Wash

Albegal SET (Wetting and Soaping Agent) X 20 min	: 1.0 g/l	80^0C X20 min

Recipe for Softening:

Arristan PSR 10mi	: 1.0 g/l	40^0C X

PROCESS FLOW CHART FOR TOPPING OF COTTON (USING COLD BRAND REACTIVE DYES):

Water Loading

↓

Fabric Loading

↓

Neutralization (70^0C, 12 min)

↓

Rinsing (60^0C, 10 min)

↓

pH Check (6.5~7)

↓

Leveling Chemicals (60^0C, 10 min)

↓

Adding Salt (60^0C, 10 min-dosing)

Running (60^0C, 10 min)

Adding Dyes (60^0C, 30min-dosing)

Running (60^0C, 15 min)

Adding Soda (60^0C, 40 min-dosing)

Running (60 min)

Sample Cutting (After 30 min)

Shade Match (Ok)

Rinsing (60^0C, 15 min)

Neutralization (60^0C, 15 min)

Rinsing (60^0C, 15 min)

Hot Wash (80^0C, 25min)

Rinsing (60^0C, 20 min)

↓

Sample Cutting (After 30 min)

↓

Shade Match (Ok)

↓

Cooling (Up to 40^0C; at 2.0 Gradients)

↓

Apply Softener (40^0C, 15 min)

↓

Fabric unload

Recipe for Topping (Cotton):

Colour: Khaki to Black **M: L -1:10**

Recipe for Neutralization		
Platilon 2900 (Acid)	: 1.0 g/l	70^0C X 12 min
X10 min		
Recipe for Dyeing		
Cibacell DBC (Leveling Agent)	: 1.5 g/l	
Ciba Fluid C (Anti-creasing Agent)	: 0.2 g/l	60^0C X10 min
Cibaflow JET (Anti-foaming agent)	: 0.1 g/l	

Dyes

Ever: Black GR	: 5.0% (owf)	
Ever: Black B dosing	: 2.5 % (owf)	60^0C X 30min-
Ever: Yellow 3RS	: 0.1% (owf)	
Ever:Red 3BS	: 0.8% (owf)	

Salts and Alkali

Glauber salt	: 10.0 g/l	Salt-60^0C X 10 min-dosing
Soda ash	: 20.0 g/l	& 10 min-Running;
Alkali-		60^0C X40 min-dosing
		& 60 min-Running

Recipe for Neutralization

Platilon 2900 (Acid) X15 min	: 1.0 g/l	60^0C X15 min

Recipe for Hot Wash

Cibapon R (Wash-off Chemicals) X 20 min	: 0.5 g/l	80^0C X25 min

Recipe for Softening:

Alkamine CWS min	: 3.0 g/l	40^0C X 15
Platilon 2900 (Acid)	: 0.1 g/l	

PROCESS FLOW CHART FOR STRIPPING:

Water Loading

↓

Machine Start

↓

Colored Fabric Loading

↓

Detergent, Sequestering Agent, Anticreasing Agent Dosing

↓

Caustic Dosing

↓

Salt Dosing

(Temperature-95^0C & Time-20 min)

↓

Hydrose Dosing

(Temperature-100^0C & Run Time-60 min)

↓

Steam-up

(Temperature-110^0C & Time-60 min)

↓

Sample Check

↓

Hot Wash with AlvatexS-Powder

(Temperature-95^0C & Time-10 min)

↓

Fabric Unloading

WASHING PROCEDURE OF DYEING MACHINE:

Water Loading

↓

Detergent Dosing- 50^0C, 5 min

↓

Caustic Dosing-50^0C, 5 min

↓

Temperature Raising at 70^0C

↓

Hydrose Dosing

↓

Steam Raising-**100˚C** & Run time 60 min

↓

Draining

↓

Water adding

↓

Acetic Acid adding

↓

Draining

YARN DYEING DEPARTMENT

(POLYESTER YARN DYEING IN HANK FORM)

MACHINE SPECIFICATION

YARN DYEING MACHINE NO: 01

Brand name: Chang LI

Machine Type: GR Series HTHP

Origin: China

No of Pump: 01

Machine Capacity:

Actual: 10kg

Original: 10kg

YARN DYEING MACHINE NO: 02

Brand name: Chang LI

Machine Type: GR Series HTHP

Origin: China

No of Pump: 01

Machine Capacity:

Actual: 40kg

Original: 40kg

FLOW CHART OF POLYESTER YARN DYEING IN HANK FORM:

Yarn loading

↓

Water loading

↓

DSB & Acetic acid Dosing

↓

Waiting ¾ minutes

↓

Color dosing

↓

Temperature raising at 135^0C & Run Time-30min

↓

Temperature Decreasing at 70^0C

↓

Draining

↓

Cold Washing

↓

Sample Check

↓

Yarn Unloading

BUTTON DYEING SECTION

PROCESS FLOW CHART OF BUTTON DYEING:

White Button Collection

↓

Scouring & Bleaching

↓

Acetic Acid Dosing

↓

Cold Wash

↓

Levelling agent Dosing

↓

Color Dosing

↓

Button Loading

↓

Sample Preparation

↓

Button Matching with fabric

↓

Bulk Production

FINISHING

MACHINE DESCRIPTION FOR FINISHING SECTION:

Finishing section consists of two lines. They are –

A. Tube line
B. Open line

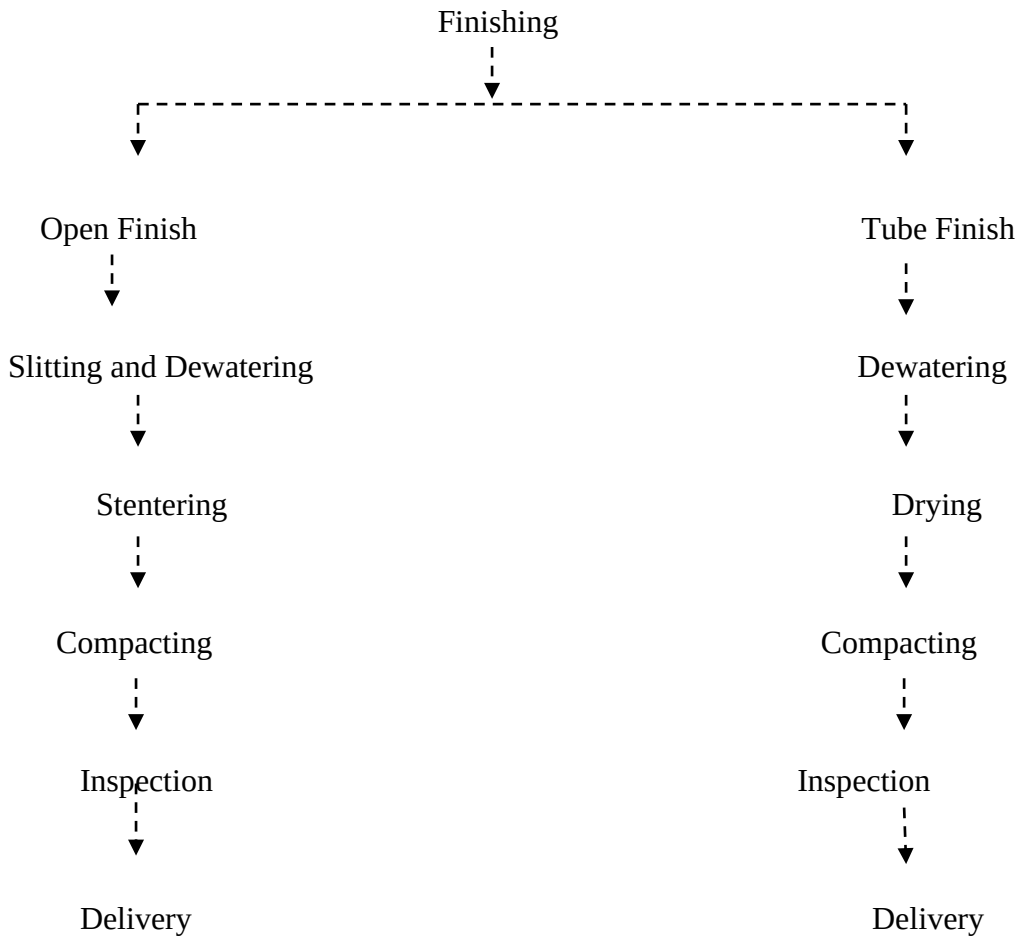
A. The machine that are used for open line are given bellow –

- Slitting and Dewatering machine
- Stenter machine

B. The machines that are used for tube line are given bellow –.

- Dewatering machine
- Dryer
- Compactor machine

PROCESS FLOW CHART FOR FINISHING SECTION:



M/C SPECIFICATION:

M/C No.	M/C Name	Brand Name	Origin
1	Slitting M/C	Bianco	China
2	Squzer M/C	Helliot	France
3	Dewatering M/C	Beneks	Turkey
4	Dryer	PMM	Turkey
5	Compactor M/C	Tube Tex	USA
6	Compactor M/C	Serteks	Turkey
7	Stanter M/C	LK	Turkey
8	Compactor M/C	Bianco	Italy

9	**Back Sewing M/C**	**Tuana Makine**	**Turkey**
10	**Fabric Inspection M/C**	**UZU**	**China**

TUBE FINISH:

WORK PRINCIPLE OF DEWATERING M/C:

After completing the dyeing process from the dyeing m/c then the fabrics are ready for de-watering. In de-watering m/c tubular fabrics are mainly processed. There is a magnetic sensor which scene the twist of the fabric and its direction and turn the fabric in opposite direction to remove twist automatically. Here dewatering is performed De-watering is the process to remove the water from the fabric completely by squeezing and it is done by the padder. A suitable expander is used before the fabric is passed through the nip of the padders, which expands the fabric flat wise and adjust the width. The expander width is adjusted as S/J- 20%, PK-25%, Int.-35%, Lacoste-40% wider than the required width. There is a pair of rubber coated padder, where water is removed from fabric when passed through the nip of it.

Normally squeezer contain single or double padders where,

- One for removing water and
- Other for applying finishing chemicals such as softener.

But this finishing is done only for the tubular fabric. Open width knitted fabrics is applied finishing treatment later in stenter.

Here present the compressor which given compress air to form ballooning before passing through the padder. This balloon remove crease mark but not form the maximum balloon otherwise shrinkage increase.

In feed & out feed traverses which present in albatross control the following functions by over feeding system.

- To control the width (dia) of the fabric.
- To control the Spirality of the fabric.
- To control the crease mark of the fabric.
- To control the length of the fabric.

Operational parameter:

- Speed: As much as possible (40-60 m/min). Higher the GSM lower the speed.
- Over feed: As required. Higher the GSM higher the over feed.
- Padder pressure: 3-7 bar as required. Higher the GSM lower the padder pressure.
- Width: Fabric width is adjusted as per required width.

Maintenance during operation:

- Proper balloon form by compressor air otherwise crease mark appears.
- Padder contract point adjust perfectly according to the fabric construction
- Otherwise accurate water will not remove.
- Albatross must be clean every one or two hours later.

WORKING PRINCIPLE OF DRYER:

After de-watering then the fabric through the dryer. The main function of the dryer is given below,

- To dry the fabric.
- To control the overfeed system.
- To control the vibration which increase the G.S.M.

This machine contains two chambers. Two mesh endless conveyors are placed lengthwise to the chamber named conveyor net and filter net, each chamber contain a burner, which supply hot air .This hot air is guided through the ducting line by suction fan .There are nozzles placed in between filter net and conveyor net .When the fabric pass on the conveyor net, hot air is supplied to the wet fabric to dry it. There are exhaust fan which such the wet air and deliver to the atmosphere through the ducting line.

The speed of the dryer depends on the temperature of the m/c & the G.S.M of the fabric. If the m/c temp. is high then m/c speed also high and the m/c temp. is low then m/c

speed also low . The vibration speed of the m/c for heavy fabric is 730 m/min and normal fabric is 480 m/min.

The temp. of different chambers according to the shade of the fabric -

Shade	Chamber-1	Chamber-2
Light	**120^0c**	**130^0c**
Medium	**135^0c**	**140^0c**
Deep	**150^0c**	**170^0c**

Operating parameters:

- Temperature:-Set the temperature between 120^0c -130^0c for white and 150^0c - 170^0c for color fabric.
- Set the over feed up to 10~20% or as required to get finish G.S.M.
- Set the speed as much as possible (6~20m/min).

  GSM ↓ speed↑

WORKING PRINCIPLE OF COMPACTOR M/C:

The main object of compactor is to make the fabric surface smooth, to control the residual shrinkage, G.S.M and if required fabric width also. To control the residual shrinkage the fabric is previously shrinkage artificially by gathering of loops of knitted fabric and it is set by heat and pressure. In tube compactor, the dried tubular knitted fabric is face to steam when it passed through the teflon coated conveyor belt. When a cotton fabric absorbs water, it swells and shrinks (particularly in length direction) because the absorbed water allows the cellulose chains to move relative stain free position. Then the fabric is passed through the expander.

This m/c contain two compaction unit to compact both side of the tubular fabric .Each unit contains a hot rotating cylinder, blanket which rotate in contact with the cylinder and Teflon cover .while passing the expander roller, the fabric is over feeded. The fabric is compacted with the pressure of blanket and Teflon cover while passing through the hot cylinder .Due to compaction stitch length is reduced. Then the fabric is passed through the counting device .Before packing, the fabric is inspected carefully.

Important parts:

- Over feed roller.
- Steam sprayers.
- Expander.
- cylinder (2)
- Blanket (2)
- Teflon covers.

Operational parameter:

- Set the temperature at 110-139^{0}C (as required)
- Set the speed as much as possible (15-25m/min). GSM ↑ m/c speed ↓
- Set the overfeed % as required, to increase GSM, overfeed need to increase to a

  certain limit.

Function:

- Shrinkage control
- GSM control
- Width control

OPEN FINISH:

WORKING PRINCIPLE OF SLITTING M/C:

The slitting m/c has 4 units - initial squeezer, de-twisting, slitter and padder. After dyeing completed and falling of water from fabric the fabric is fed in slitting m/c. So it is necessary to remove some water initially for the case of further processing in this m/c. The initial squeezer does this work. The de-twisting unit removes twists that may present in tubular rope form fabric. This unit has 3 de-twisting rollers, one rotation drum and 2 feeler rollers with sensors. By these rollers it detects twist in fabric and removes by rotating rope fabric in opposite direction. Before slitting there is a blower which

blows air to open the tubular fabric & makes it easy to pass over cigger. The cigger can be extended in circumference and opens the tubular fabric in full circumference. Slitting is done by using open mark detecting golden eye by around knife. Then the fabric passes through the padder

Where washing or chemical treatment is done. Squeezer is used to remove 60-70% of water. After removing water width is controlled by stretcher and fabric is delivered by folding device.

Operational parameter:

- Set the padder pressure as required (3-7bar)
- Set the speed as much as possible (30-80m/min).

Function of the Machine :

- Used to remove excess water after pretreatment and dyeing
- To slit the tube fabric by the knife for opening of the fabric and ready for stentering
- Delivered fabric increase free state
- Before squeezing balloon is formed with the help of compressed air passing by a nozzle or air sprayer
- It can control the diameter of fabric and GSM and shrinkage by over feeding mechanism

WORKING PRINCIPLE OF STENTER M/C:

Stenter Machine is generally used to finish the open fabric. This stenter machine consists of six chambers; each contains two burners, two blowers, two ducting line, nozzles and suction fan attach with the suction line. The burner produces hot flue gases which guided though the ducting line by the help of blower. There are nozzles placed above and below the rail. When the fabric passed through the rail, then hot air is sprayed to the above and bellows the fabric with the help of nozzle. The hot air is circulating in the chamber and the moisture in the fabric is evaporated, which leave the chamber with the help of suction fan through the ducting line. Temperature of each chamber can control automatically by controlling the intensity of burner. Generally lower

temperature is maintained the first and last chamber then other chambers. The speed of the fabric is maintained according to the moisture content of the fabric. After passing the fabrics to all the chambers, the fabric is collected for compaction.

The performance of the stentering range depends on proper introduction of the cloth into the machine. The finer the fabric is being processed, the greater the significance of the correct, crease free and fault free fabric introduction. In stenter m/c the fabric first passed through different rollers including weft straightening device, uncurling device for proper feeding of the fabric into the machine. Then it passed through the selvedge detector which detect the selvedge and adjust the rail for proper gripping the fabric in the pin arrangement. This stenter m/c consists of both pin and clip arrangement. The fabric first grip by pin and gust before entering the chamber, pin are locked by clip arrangement. To maintain proper dimension of the fabric, length wise overfeed and width wise tension is given to the fabric.

Important parts:

- Burner (12)
- Suction Fan (12)
- Exhaust air fan (6)
- Nozzle
- Over feed roller
- Chain arrangement

Function:

- Drying
- Shrinkage control
- Heat setting
- Width control
- Finishing chemical application.
- Loop control

- Moisture control, etc

Different sections of Stenter Machine:

Padder Section:

In the padder section the fabric is treated with chemicals specially with softener and acid in two tanks. Each chemical tanks contains-

For Polyester: Arristan PSR (Softener)- 10kg + Acetic Acid (acid) – 200gm	100 liter water
Or,	
Aqua IC (Softener) – 10 kg + Acetic Acid (acid) – 200gm	100 liter water

For Cotton: (COLOR):- Gemsol ASEM 20P - 10 kg

Reaknitt –FF	- 7 kg	100 liter water
$MgCl_2$	- 3 kg	
Acetic Acid	- 200gm	

For COTTON: (WHITE):- Tubengal SMF - 10 kg

Arristan 64	- 3 kg	
$MgCl_2$	- 3 kg	100 liter water
Acetic Acid	- 200gm	

Weft Straightner:

The main function of Weft Straightner is to control the bowing & Skewnesss of the fabric.

Width Setting Chamber:

This Chamber controls the width of the fabric by clip of 10 pin.

Heating Chamber:

This chamber controls the shrinkage and the G.S.M of fabric.

Temperature Range

- Cotton-- 150^0C~170^0C.
- Polyester-- 165^0C~185^0C.
- With Lycra -- 175^0C~190^0C.

Cooling Chamber:

This chamber cooled the hot fabric before reach to delivery zone.

Exhaust Motor:

This specific part used to exit the steam produced in the chambers and also exit the extra temperature from the machine.

Delivery Zone:

This zone delivered the fabric in a folded form. In this zone the fabric has to pass through several rollers in order to prevent the formation of crease mark in the finished fabric.

COMMON DYEING FAULTS WITH THEIR REMEDIES:

Uneven dyeing:

Causes:

- Uneven pretreatment (uneven scouring & bleaching).
- Improper color dosing.
- Using dyes of high fixation property.
- Uneven heat-setting in case of synthetic fibers.
- Lack of control on dyeing m/c

Remedies:

- By ensuring even pretreatment.
- By ensuring even heat-setting in case of synthetic fibers.
- Proper dosing of dyes and chemicals.
- Proper controlling of dyeing m/c

Batch to Batch Shade variation:

Causes:

- Fluctuation of Temperature.
- Improper dosing time of dyes & chemicals.
- Batch to batch weight variation of dyes and chemicals.
- Dyes lot variation.
- Improper reel speed, pump speed, liquor ratio.
- Improper pretreatment.

Remedies:

- Use standard dyes and chemicals.

- Maintain the same liquor ratio.
- Follow the standard pretreatment procedure.
- Maintain the same dyeing cycle.
- Identical dyeing procedure should be followed for the same depth of the Shade.
- Make sure that the operators add the right bulk chemicals at the same time and temperature in the process.
- The pH, hardness and sodium carbonate content of supply water should check daily.

Patchy dyeing effect:

Causes:

- Entanglement of fabric.
- Faulty injection of alkali.
- Improper addition of color.
- Due to hardness of water.
- Due to improper salt addition.
- Dye migration during intermediate dyeing.
- Uneven heat in the machine, etc.

Remedies:

- By ensuring proper pretreatment**.**

- Proper dosing of dyes and chemicals.
- Heat should be same throughout the dye liquor.
- Proper salt addition.

Roll to roll variation or Meter to Meter variation:

Causes:

- Poor migration property of dyes.
- Improper dyes solubility.
- Hardness of water.
- Faulty m/c speed, etc

Remedies:

- Use standard dyes and chemicals.
- Proper m/c speed.
- Use of soft water.

Crease mark:

Causes:

- Poor opening of the fabric rope
- Shock cooling of synthetic material
- If pump pressure & reel speed is not equal
- Due to high speed m/c running

Remedies:

- Maintaining proper reel sped & pumps speed.
- Lower rate rising and cooling the temperature
- Reducing the m/c load
- Higher liquor ratio

Dye spot:

Causes:

- Improper Dissolving of dye particle in bath.
- Improper Dissolving of caustic soda particle in bath.

Remedies:

- By proper dissolving of dyes & chemicals
- By passing the dissolved dyestuff through a fine stainless steel mesh strainer, so that the large un-dissolved particles are removed

Wrinkle mark:

Causes:

- Poor opening of the fabric rope
- Shock cooling of synthetic material
- High temperature entanglement of the fabric

QUALITY ASSURANCE

QUALITY CONTROL:

Quality control is concerned with the evaluation of test data and its application to control of the textile process, raw materials, intermediate products and final products. It is concerned not only with quality level and cost of maintaining this quality level but also concerned with the presentation of tangible values to measure quality and changes in quality. In order to control quality one must know about the consumers' expectations.

QUALITY ASSURANCE:

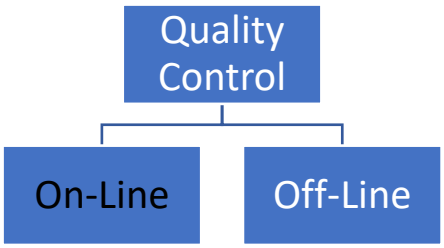
Quality assurance is defined as all those possible planned and systematic actions necessary to provide adequate confidence than a product or service will satisfy given requirements for quality. The Quality Assurance Department is assigned to maintain consistently uniform quality of the material in process and various stages of its manufacturing

OBJECTIVE OF QUALITY CONTROL:

- Research / analysis.
- Selection of raw materials.
- Process control and development.
- Product testing.
- Specification test.
- Should be given economic requirements.
- Quality assurance and so on.

QUALITY MANAGEMENT SYSTEM:

Quality assurance procedure may be provided by the following two major parts-



Online quality control:

Online quality control comprises with the raw material control, process control & finish fabric inspection.

Raw material control:

As the quality product depends upon the raw material quality, quality assurance department must ensure that the best qualities of raw material (with economical consideration) are used in production.

- The chemical should be with a known concentration and high degree of purity.
- The dyes and chemical should be compatible with each other.
- The fabric must be without faults, with proper absorbency, whiteness as per requirement of the subsequent process.

Process control:

- The method chosen for process must be provided with necessary parameters.
- Temperature, P^H, water level, specific gravity should be checked at each stage of processes.
- During dyeing, samples are taken and shade match with lap dip and when match, allow for bath drop.
- If not properly match addition or topping is done until required shade come.
- After neutralization sample is collected and match with lap dip.
- Sample is collected after fixation & matched.
- Last of all; after softening sample is collected and match with lab dip.
- Each batch should be match with other batch.
- During finishing, temperature, speed, padder pressure, overfeed should be controlled as per requirement.
- GSM, width, Spirality, shrinkage (both length & width) should be maintaining as per buyer requirement.

Finish fabric inspection:

Purpose:

To ensure that only an acceptable quality fabric is used for producing garments and proper quantity of shipment is received from the supplier.

Procedure:

- Store in charge will check the received fabric with the reported length, color and type of fabric with the stated shipment document quantity and the actual order quantity.
- The finding will be recorded in inventory report and discrepancy regarding fabric type, color and length will be notified to the Factory Manager/Manager (Dyeing & Finishing).
- For in-house products quality control officer will guide all over inspection.

QUALITY ASSURANCE:

The decision plans and action that is necessary to provide adequate confidence that a product or service will satisfy given requirement for a particular quality.

Body & Rib Inspection:

All rolls are kept in front of the inspection m/c time to time as require. The fabric are spread over the milky white acrylic inspection board ensures high transparency and even reflection of light. Then by the inspection machine fabrics are inspected visually at a standard speed against light. For any major or minor faults like thick-thin, barre mark, fall out, contamination, fly, holes, oil lines, needle line, slubs etc are recorded in inspection report to classify the fabric based on the four points system.

Collar & Cuff Inspection:

Collar & cuff are inspected visually under the light box. For any major or minor fault in collar/cuff like having wrong ply, hole, needle line, slubs, wrong design, first round problem etc are properly counted and recorded.

Quality inspector (fabric) shall check 100% of receive fabric for quality. He will identify any defect , hole or stain in the fabric and make calculation given bellow-

Point calculation system:

Defect area	Point
1” to 3”	1
3: to 6”	2
6” to 9”	3
9” to	4
For hole in fabric	4

Calculation of points is done by-

$$\frac{\text{Actual Point} \times 100}{\text{Inspected Total Yard}} = \text{Actual Point Grade}$$

- If point grade is 40 or bellow then the fabric is ok. If the result is more than 40 points, then inform it to GM or respective merchandiser.
- The fabric is also checked for shading defect in side by side and length. Any non-conformities/ shading will be notified to asst. manager using inspected reports. Roll wise color uniformity card is maintained for identification of shade variations.
- During the fabric inspection if the yardage of any roll is reported more or less by the fabric inspection m/c then the one specified in the roll, the roll will be measured manually using measuring tapes. Only calibrated measuring tape shall be used.
- The result of fabric inspection shall be recorded in fabric inspection report.

DEFECTS FOUND IN THE FINAL INSPECTION:

- Uneven shade
- Oil spot
- Neps
- Crease mark
- Machine Stoppage mark
- Listing
- Line mark
- Double yarn
- Bowing
- Fly yarn contamination

- Dead cotton

ON LINE TESTS:

For Pretreatment:

- pH test .
- Absorbency test.
- Fabric width measure.
- Whiteness test.
- Water quality test.

For Dyeing :

- Shade matching check.
- pH check .
- Wash fastness Check.

Machine checking:

OFF LINE QUALITY CONTROL:

Niagara Textiles Ltd. have all the facility for off-line quality control of the materials used and processed materials. There are two types of materials are tested in GKL laboratory for the purpose of quality control. This are-

- Fabric
- Raw materials

Fabric testing:

All the Off-line tests for finished fabrics can be grouped as follows:

- Physical Tests
- Chemical Tests.

Physical tests:

- Fabric inspection by 4-point system.

- G.S.M test.
- Width of the fabric measure.
- Rubbing test.
- Pilling and Snagging test.
- Shrinkage test

Chemical tests:

- Color fastness to water
- Color fastness to wash
- Color fastness to rubbing
- Color fastness to perspiration
- Oxidative test damage

Raw material testing:

- Water : pH & Hardness test
- Glauber salt : Purity test
- Acetic Acid : Strength test
- Caustic soda : Strength test
- Soda ash : Strength test
- Hydrogen per oxide : Strength test

SCOPE OF QUALITY CONTROL & TESTING:

The scope of quality control testing in **Niagara Textiles Ltd.** is little good. It has the following ability for quality control & testing:

- Fabric inspection by 4-point system.

- GSM & Shrinkage test.
- Wash fastness test.
- Rubbing fastness test.
- Color difference check by data base.
- pH test .
- Dye concentration test.
- Pilling and snagging test.

MAINTENANCE

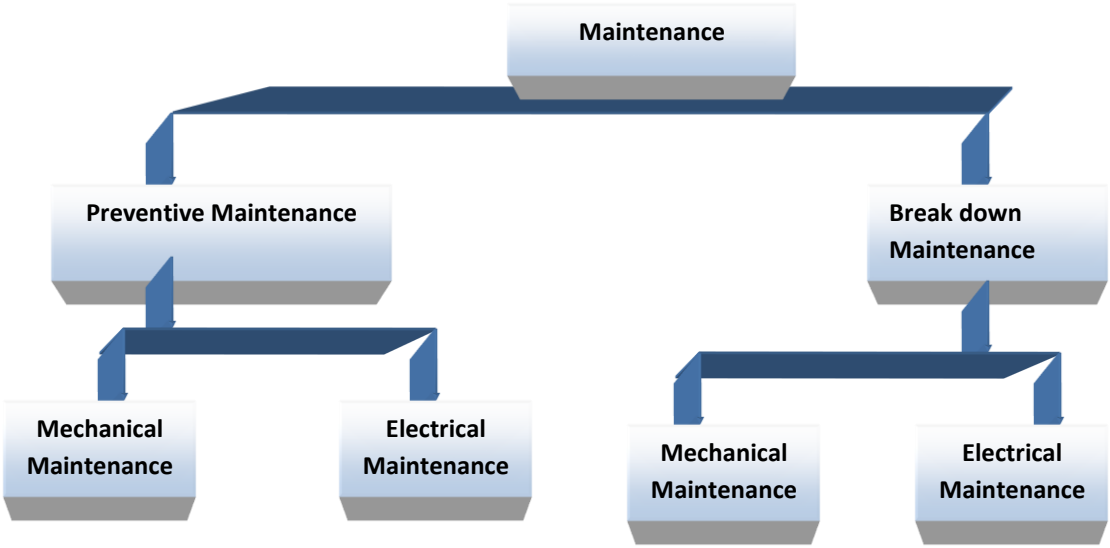
MAINTAINANCE:

The act which is done to Keep the factory plan equipments machine tools etc. in an optimum working condition, minimize the breakdown of m/c's to improve Productivity of existing m/c tools and avoid sinking of additional capacity and to Prolong the useful life of the factory plant & machinery is called Maintenance.

OBJECTIVE OF MAINTAINANCE:

- To Keep the factory Plants, equipments, Machine tools in an optimum working condition.
- To ensure specified accuracy to product and time schedule of delivery to customer.
- To keep the downtime of Machines to the minimum thus to have control over the production Program.
- To Keep the Production cycle within the stipulated range.

FLOW CHART OF MAINTAINANCE:



Preventive Maintenance:

In **Niagara Textiles Ltd**. the Preventive Maintenance is a predetermined routine activity to ensure on tome inspection or checking of facilities to uncover conditions that may lead to Production break downs or harmful depreciation.

Break down Maintenance:

In this case, repairs made after the equipment is out of order and it cannot perform its normal functions.

MAINTAINANCE OF ALL MACHINES IN ROUTINE BASIS PER WEEK:

Day	Name of Machinery	Time will be given
Saturday	**Dyeing M/C (Dilmenler)**	**7 am to 10 am**
Sunday	**Others Dyeing m/c**	**9 am to 11 am**

Monday	**Squeezer M/c ,Dryer M/C**	**8 am to 11 am**
Tuesday	**Lab Dyeing Machinery & Turning M/C**	**10 am to 12 am**
Wednesday	**Bangla Dyeing M/C**	**9 am to 11 am**
Thursday	**Compactor & Heat setting M/C**	**8 am to 10am**
Friday	**Utility Lines, Sub-station Compressor, Air Cooler, Pump House, Trolleys.**	**7 am to 10 am**

MAINTAINANCE TOOLS & EQUIPMENTS AND THEIR FUNCTIONS:

1. Combination tools (Spanner)

Function: Tightening & Loosening of Nuts & bolts

2. Socket Ratchet set

Function: Tightening of Nuts & bolts

3. Slide Range

Function: Tightening & Loosening of Nuts & bolts

4. Pliers

Function: Tightening & Loosening of Nuts & bolts

5. Pipe threat Cutting Tools

Function: To Cut the threat in Pipe.

6. Bearing Puller

Function: To assist the Opening of bearing from shaft.

7. Pipe Range

Function: Tightening & Loosening of Pipe Joint

8. Pipe Cutting Tools

Function: For Pipe Cutting.

9. Hole Punch

Function: Punching the hole.

10. Divider

Function: For circle marking on metal & wood

11. Easy Opener

Function: To open the broken head bolt

12. Heavy Scissor

Function: Cutting of gasket & steel sheet.

13. Oil Can

Function: Oiling of moving Parts.

14. Drill M/C and Drill bit.

Function: For Drilling.

15. Grease Gum.

Function: For greasing of moving Parts of M/C.

16. Girding M/C

Function: For grinding & Cutting of mild steel.

17. Welding M/C

Function: For welding & Cutting.

18. File

Function: For Smoothing the Surface.

19. Hammer

Function: For Scaling & right angling.

20. Hacksaw blade.

Function: For metal Cutting.

21. Handsaw (wood)

Function: For wood Cutting.

22. Grinding Stone.

Function: For smooth finishing

23. Grinding Paste

Function: For easy Cutting of metal

MAINTAINANCE PROCEDURE:

Normally Preventive Maintenance is done here. During Maintenance Procedure following Point should be checked:

Maintenance: Mechanical:

Machine: Dyeing M/C

Serial	Item need to be checked & Serviced
1	Creasing the winch bearing
2	Complete cleaning of Machine
3	Cleaning of drain Valves, replace scales if required
4	Check air supply filters, regulators and auto drain seals
5	Clean filters element and blow out
6	Greasing of unloading roller bearings
7	Checking of oil level and bolts of unloading roller gearbox
8	Checking of unloading roller coupling and packing
9	Checking and cleaning of main vessel level indicator
10	Check the oil level of Pump bearing and refill if required
11	Check the function of heat and cool modulating valves
12	Check all belts and belt tension

Maintenance: Electrical

Machine : Dyeing

Serial	Item needed to be checked and serviced
1	Check & Clean fluff and dirt at all motor fan covers
2	Check all motors
3	Check Main Panels boards
4	Check Panels Cooling fan & clean it filter
5	Check all circuit breaker , magnetic contractors and relays
6	Check Main Pump inverter and its Cooling fan
7	Check Current setting of all circuit breaker & motor over Loads
8	Visual Checking of all Power & Control & Cables
9	Check all Pressure switches
10	Check Calibration of Main vessel
11	Check DC drive of kneel motors
12	Check Calibration of all additional tank
13	Check all Pneumatic solenoids
14	Check Calibration of Heating / Cooling
15	Check setting & operation of lid safety switches
16	Check all emergency switches
16	Check all indicating Lamps
17	Check all On / Off switches
18	Check all Signal isolators
19	Check Key Pad & display of Controller
20	Check Proximity Switches

Remarks: When I was trainee of **Niagara Textiles Ltd.** then I saw that the Maintenance staffs and overhead of Maintenance department were skilled enough and efficient.

UTILITY-SERVICES

BOILER:

The equipment used for producing steam from water is called steam generator or boiler. The boiler used for producing steam in GKL is Cochran boiler which is a fire tube type boiler. This produced steam is supplied by the steam line in different section. Simple vertical boiler of fire tube type is mainly used in small plant requiring small quantity of steam and where floor area is limited.

CLASSIFICATION OF BOILERS:

Fire – tube boiler(gas):

Low pressure, low running cost, less chance of busting but greater risk of damage.

Water – tube boiler:

High pressures, high running cost high chance of bursting & don't damage the whole boiler. As this factory used fire tube boilers and its description is given below. In boiler house, steam is produced at high temperature and pressure. This produced steam is supplied by the steam line in different section.

USES:

Steam use for –

- Power generation (steam engine / turbine).
- Processing in industries (dyeing & finishing mill, sugar mill, paper mill etc.).
- Heating purposes (houses, offices, hospitals etc in cold countries).
- Hot water supply.

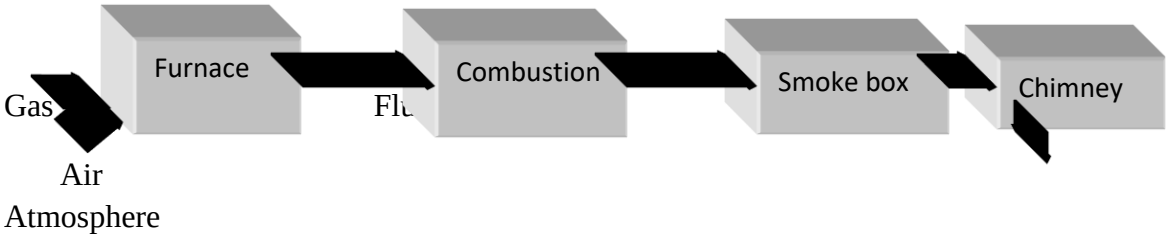
ESSENTIAL OF A GOOG BOILER:

- Required pressure and quality at minimum fuel.
- Initial installation and maintenance cost low.
- Parts approachable for repairs.
- Quick starting capacity.
- Conform to the safely regulations of boiler act.

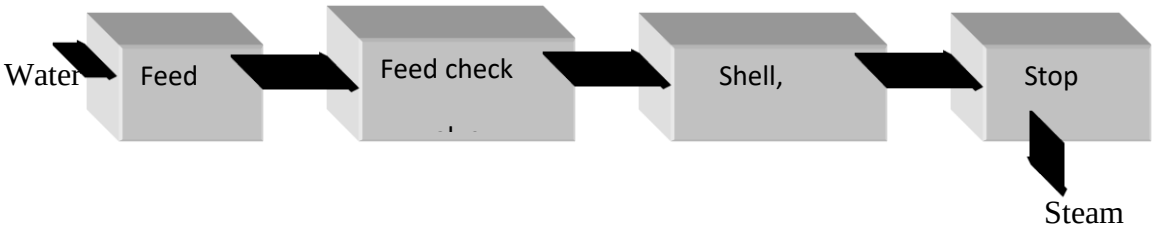
WORKING PRINCIPLE OF BOILER:

The gas is fed through the front side to the furnace where fire created by electric spark .The blower move the fire into the flue pipe by compress air and then the flue gases enter through the combustion chamber which is lined with fire bricks on the outer wall of boiler. The hot gases passing through the horizontal smoke tubes give their heat to the water and convert water into steam. This steam gets accumulated in the upper portion of shell from where it can be supplied to the user's .Finally, the flue gases are discharged to the atmosphere through the smoke box and chimney.

Gas flow diagram:



Water flow diagram:



BOILER SPECIFICATION:

Boiler No: 1

Brand name	: COCHRAN Boiler
Manufacturer Company	: BIB Cochran Ltd.
Model	: Borderer.
Origin	: Scotland, UK.
Serial No	: 25/2387.

Capacity	: 4.5 ton/hr.
Max. Capacity	: 4.56 ton/hr.
Manufacture Date	: 1998.
Max. Allowable pressure	: 11 bar.
Working pressure	: 8 bar.
Safety Pressure	: 9 bar.
Max. Operating pressure	: 10.86 bar
Max. Allowable temperature	: 188^0C
Max. Heat output	: 4833 kw
Fuel type	: Gas and Furnace Oil.

Boiler No: 2

Brand name	: Cochran
Manufacturer Company	: Rolls Royce.
Origin	: Scotland, UK
Model	: Borderer.
Serial No	: 25/2375.
Capacity	: 3.5 ton/hr.
Max. Capacity	: 3.53 ton/hr.
Max. Allowable pressure	: 11 bar
Working pressure	: 8 bar.
Safety Pressure	: 9 bar.
Max. Operating pressure	: 10.86 bar
Max. Allowable temperature	: 188^0C

Max. Heat output : 4833 kw

Year of manufacture : 1998.

Fuel type : Gas.

Boiler No: 3

Brand name : COCHRAN Boiler

Manufacturer Company : BIB Cochran Ltd.

Model : WEE CHIEFTAIN.

Origin : Scotland, UK.

Serial No : 23/3542.

Capacity : 1.5 ton/hr.

Max. Capacity : 1.53 ton/hr.

Manufacture Date : 2003.

Max. Allowable pressure : 11 bar.

Working pressure : 8 bar.

Safety Pressure : 9 bar.

Max. Operating pressure : 10.86 bar

Max. Allowable temperature : 188^0C

Max. Heat output : 940 kw

Fuel type : Gas .

COMPRESSOR:

Basically Compressor generates the compress air which distributed in the knitting, dyeing & finishing section and this air is used for following reasons:

- To clean the m/c parts in knitting zone.
- To open different type of valves in dyeing m/c during dozing, water feeding, drainage time.
- Squeezer needed compress air for balloon form.
- Turning M/C's needed compress air for batch preparation.

Compressed air is produced by air compressor. There are three air compressors and three dryers in **Niagara Textiles Ltd.** for producing compressed air.

Name of the compressor **: COMP AIR.**

Origin **: England.**

DRYER:

Dryer dried the moisture which present in the compress air.

Name of the compressor **: COMP AIR.**

Origin **: England.**

Working principle:

When compressor generates compress air then it's directly store into the air vessel tank and its capacity is 10 kg. Compress air contain the moisture such as 7 kg air contain 1 kg moisture and this moisture is dried by the dryer.

ELECTRICITY:

The main source of electricity of **Niagara Textiles Ltd.**is the government supply (PDB) .But they had three diesel generators to overcome the problem due to the failure of electricity.

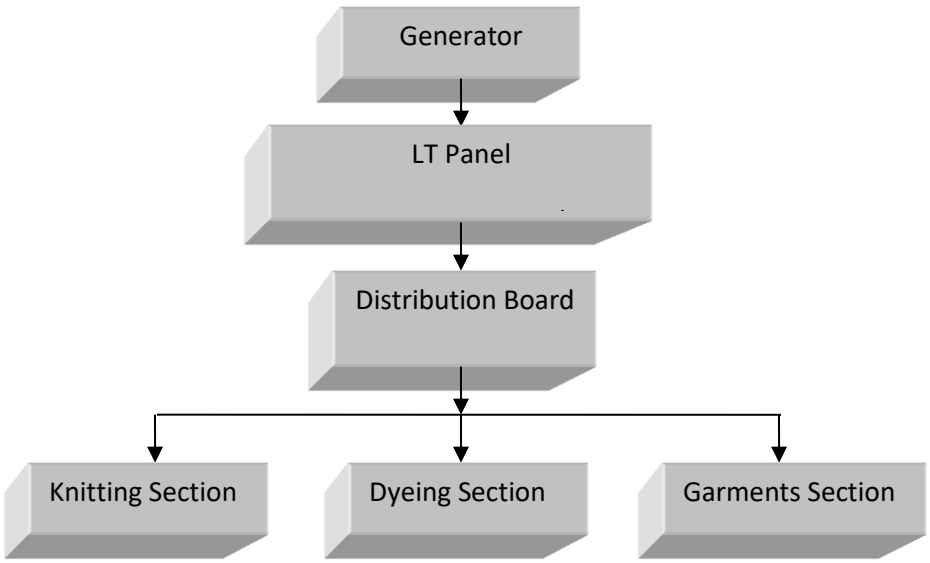
SOURCE OF ELECTRICITY:

- Diesel generator(During Power Failure)
- Government Supply(PDB)

TOTAL POWER PRODUCATION CAPACITY:

- Diesel generator – 1150 kw.

POWER DISTRIBUTION DIAGARAM:



POWER CONSUMPTION (APPROXMATELY) FOR DIFFERENT SECTION:

Section	Load capacity	Usable power
Knitting	250kw	**180 kw**
Dyeing & finishing	400 kw	**200 kw**
Garments	500 kw	**250 kw**
E T P	100 kw	**70 kw**
W T P	150 kw	**100 kw**
Boiler & water pump	160 kw	**90kw**
Laboratory	**30 kw**	**20 kw**

GENERATOR SPECIFICATION:

Generator 1:

Type : Diesel Generator

Brand : SDMO

Company : SDMO

Model : GS 500

Origin : France

Manufacture Date : 1998

R.P.M : 1500

Capacity : 400 kW or, 500 K.V.A

Generator 2:

Type : Diesel Generator.

Brand : DALE.

Company : Dale Power System.

Model : ME -6200.

Origin : England.

Capacity : 250 kW or, 312K.V.A.

Generator 3:

Type : Diesel Generator.

Brand : ECTRO.

Company : Volvo.

Model : EM 500V.

Origin : Sweden.

Mfg Date : 2006.

R.P.M : 1500.

Capacity : 400 kW or, 500 K.V.A

STORE

&

INVENTORY CONTROL

INVENTORY:

Inventory in a wider sense is defined as any idle resource of an enterprise; however it is commonly used to indicate materials, raw materials, finished, semi- finished, packing, spares, and other stocked in order to meet an expected demand on distribution. Even though inventory of materials is an idle resource in the sense & is not meant for the most immediate use but it is almost necessary to maintain some inventories for the smooth functioning of an organization.

CAUSES OF MAINTAING INVENTORY:

- To run manufacturing operations economically.
- To take care of uncertainties – uncertainty in demand from customers and uncertainty in procuring the material in time.
- To reduce the clerical cost and to take advantage of discounts, transportation etc.
- It takes time to complete one operation and more products from one stage to another.
- To take advantages of order cycles

SCOPE OF INVENTORY CONTROL:

- Raw materials inventories
- Production inventories
- In process inventories
- Finished goods inventories
- Maintenance, repair and operating inventories
- Miscellaneous inventories

FREQUENCY OF INVENTORY CONTROL:

- Daily inventory control
- Monthly inventory control
- Yearly inventory control

PROCUREMENT SYSTEM:

- Dyes (mostly used like Cibacron and Remazol dyes) and chemicals (regular items like Sequestering agent, Ant creaser, Anti-foaming, Leveling agents, Stabilizer etc.) are imported from India, Germany, Singapore, China, Switzerland through pro forma invoice.
- Some dyes and chemicals are collected by direct purchase through indent.
- Some dyes are purchase from local market if urgently required.
- Glauber salt and Soda ash are purchase through pro forma invoice and also from local distributor through indent.

INVENTORY MANAGEMENT FOR RAW MATERIALS:

In **Niagara Textiles Ltd.** there are different inventory systems are maintained for different raw materials.

Grey Fabric Store:

All the grey fabrics are stored in the fabric store near the Knitting section. Different types of fabric are listed in the sheet according to fabric types, quantity and consumer's requirement.

Dyes and Chemicals store:

There is a different store for dyes and chemicals. Varies types of dyes and chemicals are stored here according to dyes and chemicals companies. Different types of dyes and chemicals are listed in a sheet. In the sheet the stored quantity of dyes and chemicals are also included. Every day the sheet is updated and a copy of this sheet is supplied to the Factory manager, Dyeing manager, Dye house and Lab section.

Finished goods store:

In **Niagara Textiles Ltd**. supplied its dyed & finished fabrics to its garments section. So, dyed finished fabrics are stored for short time in the finishing section. All the delivered fabrics are noted on the sheet according to the lot no, quantity, fabrics diameter, buyer's name, Color & considering other technical parameters.

Spare parts store:

In Niagara Textiles Ltd. required amount of spears of different machines are stored in the mechanical store room. All the spears are listed in a sheet which is controlled by the mechanical & maintenance personnel. Spares are arranged in the store room according to their size, quantity & requirements. There are shelves in the store room to keep the small spare parts.

STORE CAPACITY:

Items	Amount
Dyes	**5-6 tons**
Chemicals	**25-30 tons**
Yarn storage	**30 tons**
Grey fabric	**40 tons**

COST-ANALYSIS

COSTING OF THE PRODUCT:

Costing system mainly describe how the cost of the final product is fixed by the company / top managements. As it is a garments manufacturing factory, so according to the buyer / customer requirements of final garments, merchandiser give the consumption of fabric with specifications. Then it is calculated how much dyestuffs & chemicals are required for processing. After that, the final cost is fixed including some profit. Then the unit price is offered to the buyer for their approval.

COSTING OF A PRODUCT INCLUDE:

- Yarn cost
- Knitting cost
- Dyes & chemicals cost
- Cost of dyeing
- Cost of finishing
- Cost of cutting ,sewing, accessories etc
- Cost of printing (If any)
- Labor cost (direct & indirect)
- Factory cost
- Office & administrative cost
- Sales and caring cost
- Others cost
- Profit, etc.

PRICE OF DIFFERENT OPERATION (APPROXMATELY):

- Dyeing +Finishing charge for light shade : 80~90 taka
- Dyeing +Finishing charge for medium shade : 85~90 taka
- Dyeing +Finishing charge for deep shade : 100~110 taka
- Tube finishing (Dewatering +Dryer + compactor) : 15-20 taka

Remarks: The costing of the product is most secret matter of the Industry. They are not interested to flash the cost related data. So we could not collect the Costing process of the products.

MERCHANDISING & MARKETING ACTIVITIES

Definition of merchandising:

To ensure sales, companies go to great lengths to make sure that their products are visible in stores and are presented in an appealing, 'sellable' way. This is called merchandising, which includes product packaging, placement, promotions and pricing to appeal to the target market.

MERCHANDISER as a Word:

M: Managerial Capacity

E: Efficient in English regarding Communication

R: Regular in all aspects

C: Confident

H: Honesty

A: Positive Attitude

N: Nicely behave and never argue with buyer

D: Devoted to service

I: Better IQ

S: Sincere in work

E: Enthusiastic in nature and excellent in dealings

R: Regular in correspondence & rational in behaviour

Merchandising (Factory & Buying house):

Activities on new order in hand:

1. Scheduling & planning with production department
2. Product package analysis
3. Product package receive from buyer

4. Costing & price Quoting
5. Fabric & accessories consumption
6. Negotiation & order confirmation

Activities on buyer sourcing (Marketing job):

1. Data collection from buying house
2. Potential buyer selection
3. Connection with local buying house
4. Connection with buyer through mail
5. Attend national & International workshop & seminars
6. Hosting a web page
7. Display room maintain
8. Maintaining an R& D department
9. Maintaining & developing strong relationship with buyer and suppliers

Activities on running order:

1. TAC Calendar follow up
2. Gantt chart follow up
3. Fabric follow up in dyeing & finishing
4. Printing – Embroidery – Washing follow up
5. Cutting – Sewing- finishing follow up
6. All sample arrangement
7. All lab test arrangement
8. All inspection arrangement
9. Ensure all garments shipment on time

Activities on confirmed order:

1. TAC preparation
2. Gant chart preparation
3. Color standard receive
4. Lab-dip submission
5. Print & embroidery development
6. Yarn, fabric & accessories booking
7. Master L/C receive
8. BB L/C opening

Quality of a merchandising manager:

1. To expand the business by exploring new buyers for the organization,Negotiate with buyers and assist the company by achieving better prospects for the company.
2. To Monitor TNA Chart for effective Implementation of Buyers requirements.
3. To oversee the work of merchandisers and guide them in execution of orders.
4. Firming up the business order, problem solving and taking care of other allied issues in execution of orders at factories.
5. Maintain Order status and planning targets on each buyers.
6. Follow up on Execution from Merchandising to Factory and to Buyer

.7. Prior experience in Merchandising with a garment company.
8. Excellent Communication and Interpersonal Skills with leadership qualities mandatory.
9. Excellent Negotiation Skills.
10. Young and Active.
11.Computer knowledge preferred

Quality of a senior merchandiser:

1. To Head the entire Merchandising Operations.
2. Lead and manage a team of Merchandisers of various levels.
3. Good Leadership and communication levels apart from excellent maturity.
4. Operation responsibility includes coordinating with the sourcing base, production and buyers.
5. Handling communications with buyers.
6. Planning capacity and fixing production targets jointly with production team.
7. Ensure smooth and timely execution of the orders.
8. Effective closure of all orders with proper sign off.
9. Other job responsibility includes thorough knowledge of cost and quality aspects.
10. Getting approval for style and Fit samples, P. P. samples, T. O. P/ Production samples, Lab dips, accessories and trims, etc.
11. Should have worked with big clients and large volumes.
12. Must have a proven track record of buying, vendor developments & merchandising.

13. Should be self driven, taking initiative and follow up from production to shipment.

14. Good Inter personal Skills.
15. Articulate Communication Skills & Team Work

Quality of an assistant merchandiser:

1. He should be able to assist Divisional Manager and able to work in team.

2. Good in communication with buyers and understand their requirements.

3. Should take care of Approval Process covering style cycle of style.

4. Should be able to handle Product Development / Sampling

5. Should be good in time & action planning, & production follow-ups with the vendors.

. 6. Must be computer literate with knowledge of MS Office.

7. Should be able to work in a team, proactive,

8. Should have production follow-up skills, can perform under pressure; can meet the business and delivery targets through independent decision making at various stages of garment manufacturing

MARKETING INFORMATION:

The **Niagara Textiles Ltd.** is a 100% export oriented knit garments manufacturer. So, they sold their product to export market especially to Europe. They also take same initiative for market development through communicating with new buyer and taking part in different international garments fair.

As it is an apparels manufacturing industry, its main product are T-shirt, Polo shirt, Sweat-shirt, Golf shirt, Tank Tops, Children wear, Jogging suits, Under wear, Runners pant, Skirolly, Functional wear, Fashion Dresses and Sportswear etc. **Niagara Textiles Ltd.** ensures safe/metal free garments as per customer requirements, through practice of metal detection & needle/metal control procedures.

Childrens
Product ID# 1038

Childrens
Product ID# 1039

Childrens
Product ID# 1040

Childrens
Product ID# 1041

Childrens
Product ID# 1042

Childrens
Product ID# 1043

Childrens
Product ID# 1044

Childrens
Product ID# 1045

Childrens
Product ID# 1046

Mens
Prodcut ID#1014

Mens
Prodcut ID#1015

Mens
Prodcut ID#1016

Mens
Prodcut ID#1017

Mens
Prodcut ID#1018

Mens
Prodcut ID#1019

Mens
Prodcut ID#1021

Mens
Prodcut ID#1022

Mens
Prodcut ID#1023

Mens
Prodcut ID#1024

Mens
Prodcut

Womens
Product ID#1026

Womens
Product ID#1027

Womens
Product ID#1028

Womens
Product ID#1029

Womens
Product ID#1030

Womens
Product ID#1031

Womens
Product ID#1032

Womens
Product ID#1033

Womens
Product ID#1034

Womens
Product ID#1035

Womens
Product ID#1036

Womens
Product ID#1037

All Brand Products ::

Brands
Product ID# 1050

Brands
Product ID# 1051

Brands
Product ID# 1052

Brands
Product ID# 1053

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Product ID# 1054

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Product ID# 1055

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Product ID# 1056

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Product ID# 1057

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Product ID# 1058

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Product ID# 1059

Brands
Product ID# 1060

Brands
Product ID# 1061

MARKETING STRATEGY:

Now a day, the marketing strategy is the key feature for a export oriented company. If the marketing strategy is not good then it is not possible to survive in the competitive global market. In case of marketing the garments good dealings with the buyer is very important.

In **Niagara Textiles Ltd.** mainly the merchandising department and the higher officials deals with the buyer. The company has some fixed buyers. These buyers give their orders continuously all over the year. The marketing officers and the merchandising department communicate with the buying house all the year.

MAJOR BUYERS:

Sl.	Buyers
1	H & M
2	C & A
3	Techibo
4	New Look
5	Tesco
6	Big Star
7	Target
8	Loblaws
9	Sears
10	Okaidi

SOCIAL & ENVIRONMENTAL INRORMATION

SOCIAL POLICY:

Safety Policy:

- Company always strives to provide safe and hazard free atmosphere in production floors for all workers.
- Every floor has two exits for in case of emergency & also have the Fire Evacuation Plan at the point of exit.
- Every floor has sufficient number of firefighting equipments such as fire extinguisher, fire hose cabinet, fire alarm switch etc.
- Every section has a group of people who have been trained for protect the emergency fire hazard situation.
- Unannounced fire drill is arranged once in a month.
- Each floor has first aid box containing sufficient number of medicines in case of emergency.
- Each floor has sufficient number of Personal Protection Equipment such as mask; hand gloves, goggles, metal gloves, air plug etc. are provided for ensuring safety.
- Pure drinking water is available in each floor.
- There is a medical center in the factory and a Doctor looks after the health of the workers.

Employee Welfare Policy:

- All employees/ workers are entitled to free medical checkup in the medical center in our factory.
- Each floor has proper ventilation & sufficient ceiling fans exhaust fans are there for good air supply.
- Each floor has sufficient number of washrooms.

- Each floor has sufficient lighting to facilitate production.
- All employees are entitled to overtime bonus, Eid festival bonus, house rent, medical allowance, Friday & holiday allowances.
- A large dining hall is in our factory including pure drinking water & well sitting arrangement.
- A Group Insurance is made for entire employees of the company and already availed two insurance claims due to death of workers against it.
- A child day care center is in our factory & children of workers take proper care and feeding.
- Maternity leave & maternity benefit for female workers are provided as per labor law.

Recruitment Policy:

- No child labor in our factory.
- No gender discrimination in our recruitment procedure.
- There is no force labor.

Other Policies:

- Environment Policy: There is an Effluent Treatment Plant (ETP) in our factory premises to refine industrial dust for hazard free environment.
- We comply the rules & regulations of different regulatory bodies such as factory inspection authority, many govt. & non-govt. agencies.

EFFLUENT TREATMENT PLANT (ETP):

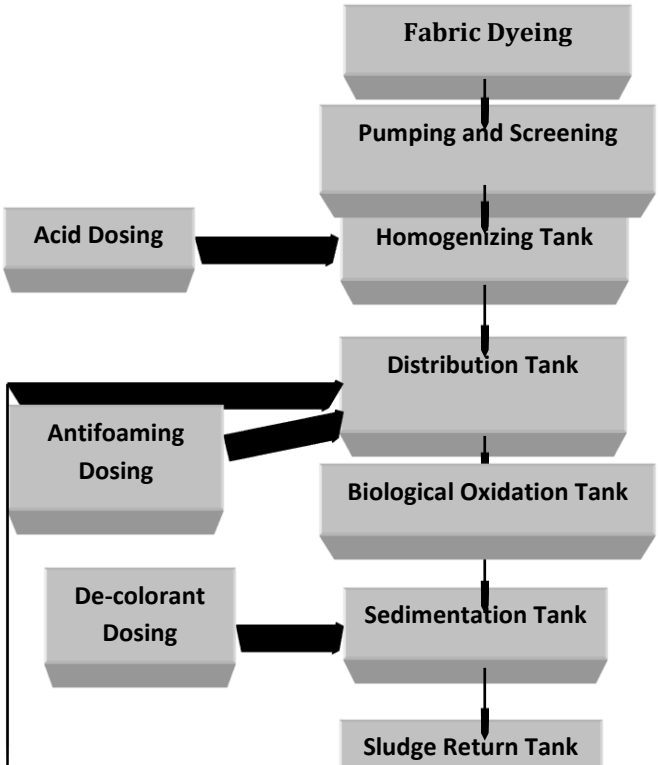
Fig: ETP of Niagara Textile Ltd.

The effluent generated from different sections of a textile industry must be treated before they are discharged to the environment. Various chemicals and physical means are introduced for this purpose.

Capacity : $80m^3/hr$

Cost : Tk. $2.5 / m^3$

Process Flow chart of Biological Effluent Treatment Plant:



Function of different Unit of Biological Effluent Treatment Plant (E T P):

Screening unit:

It works like a filter. By filtering waste water, it removes threads, pieces of fabrics, small metal pieces etc. In this unit a rotating brush is used for clean the pores if screen. The brush rotates periodically.

Storage and Homogenization tank:

Different waste water from varies process is stored and makes a homogeneous mixture by mixing different concentration of waste water.

Neutralization tank:

Neutralization of waste water is performed by dosing 98% H_2SO_4 as required to control the PH

Of waste water PH range 6.5 to 7.5.

Distribution tank:

It distributes the water to the biological oxidation tank. Continuous aeration is supplied here. Antifoam is dosed here to control the foaming in the oxidation tank.

Biological oxidation tank:

It is the heat of E T P. The entire harmful chemicals are damaged here by breaking their bonds. This is done by bacteria. To ensure the proper function work and growth of bacteria, few conditions must be maintained.

- Temperature : 35º to 37º C
- PH (Maximum) : 6.5
- Dissolved oxygen : 4 PPM

Sedimentation Tank / Biological feeding tank:

Treated water is overflowed here from oxidation tank. Decolourent is used here to destroy the color of waste water.

Settling tank / Sedimentation Basin:

A tank or basin in which waste water is held for a period of time, during which the heavier solids settle to the bottom and the lighter material will floats to the water surface. In this tank sludge is immersed and the harmless water is discharge to ponds, Land, river etc.

Sludge Thickener:

Sludge taken here from clarifier. Polyelectrolyte is dosed coagulate the sludge. After one hour of Polyelectrolyte dosing aeration is stopped and fresh water discharge to drain when sludge is taken. The thickened sludge is transferred to the sludge thickener bed.

Sludge Thickener bed:

Here sludge is dried which is used as good fertilizer as well as fuel of brick field. Sludge is dried under the sunlight.

Required Chemical or Biological ETP:

H2SO4:

Function**:** Neutralize the waste water controlling the PH. It is auto dispensed in the neutralization tank.

Polyelectrolyte:

Function: Used for sedimentation / sludge coagulation and also killing bacteria.

Antifoaming Agent:

Function: Used for reduction / controlling foam. It is used auto / manually in the distribution tank.

De-colorant:

Function: Used for removing color. It is used auto / manually in the sedimentation feeding tank.

Sodium Hypochlorite:

Function: It is used to kill the harmful bacteria. It is used in the biological oxidation tank.

Product Quality Checked:

- Biological Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Total suspended solids
- Total dissolved solids
- Color
- pH etc.

Remarks: Waste water from processing industries e g. Dyeing , Printing , Finishing and washing causes great harmful effect on our environmental, As a result agricultural land loses its fertility, natural water becomes polluted aquatic life is destructive and crops are damages.

So, it is important to control ETP plan.

DISCUSSION

& CONCLUSION

DISCUSSION:

Niagara Textiles Ltd. is a joint venture limited company with composite knitwear manufacturer & exporter. The **Niagara Textiles Ltd**. is committed to the best human workplace practices. Their goal is to continuously improve their Human resource policies and procedures through education, training, communication and employees involvement. Right from inception the policy of the company has been to provide total customer satisfaction by offering quality knitwear in time. Working on new concepts in styling & content of the knitwear is a continuous activity in **Niagara Textiles Ltd**. with an objective to up the quality and the value of merchandise. To meet the commitments of quality and prompt delivery, **Niagara Textiles Ltd**. Decided to integrate the manufacturing process in a planned manner. Over the years the entire process has been integrated by importing sophisticated machinery from world-renowned manufacturers. For achieving their goal, **Niagara Textiles Ltd**. has recruited a high profiled human resource team. The production is controlled by technical persons. All of the decision makers of production sector in

Niagara Textiles Ltd. are textiles graduates. According to their capacity they have an enriched production team which is very rare in other factories of Bangladesh. The working environment of **Niagara Textiles Ltd**. is very friendly. All of the executives & employees of **Niagara Textiles Ltd**. are very much cordial & they always appreciate the learners.

The goal of **Niagara Textiles Ltd**. is to get high production & to maintain the quality of the product at a minimum cost. There is no polar fleece & auto stripe m/c in **Niagara Textiles Ltd**. so **Niagara Textiles Ltd**. is not able to produce all types of knit structure. There is no person to input the self shade of different types of lot everyday in the spectrophotometer but for accuracy of the recipe it is very important to input the self shade of different lot of dyes in a regular basis. In dyeing lab **Niagara Textiles Ltd**. is using digital pipetting system but if they use dispense type digital pipetting system I think their accuracy will increase to a maximum level. For dyeing they are using Fongs m/c but if they use thies or sclabos m/c I think their product quality will be higher. In garments section for cutting they are using manual straight knife cutting m/c but if they use computerized cutting m/c their accuracy will increase & their efficiency will increase to a maximum level. I think if they improve the above things I think their product quality, their efficiency & their accuracy will be maximum.

CONCLUSION:

There is large difference between the theoretical knowledge and practical experiences. This is truer in case of the study of Textile Technology. Industrial attachment or, Industrial training is an essential part for textile education because it minimizes the gap between theoretical and practical knowledge. This Industrial training increase our though a lot about textile technology. It also helps us to know a lot about industrial production process, machineries, and industrial management and made us suitable for industrial life. Besides it gives us the first opportunity to work in industry. So we can say industrial attachment prepare us for the expected destiny of practical life.

I have completed my industrial attachment from **Niagara Textiles Ltd.** During my two-month long industrial training at **Niagara textiles Ltd.** I got the impression that this factory is one of the modern export oriented composite knit garments industry of our country. This factory does not compromise in case of quality. So, they have established on-line and off-line quality control of each product. Besides, they also use the good quality yarn, dyes and chemicals in their production process. Due to this, it has earned a “very good reputation” in foreign market for its quality product over many other export oriented textile mills. It

has very well educated and technically experienced manpower to get rid of any defect in production process. It has also a good organizational hierarchy.

SOME OPINNION FOR ME:

- Knitting production needs to increase as well as technical persons need to be employed there.
- More skilled labor should be used in a project and the overall efficiency will increase.
- Dyeing floor should keep always neat and clean. It kept wet after unloading the fabric from the dyeing machine specially, for Athena. Water must be swept time to time.
- During the transport of the fabric and during the loading of the m/c, fabrics get soiled due to their drawing over the floor. This makes the fabric/part of the fabric dirty. It may require more scouring/bleaching agent or may create stain.
- Due to the pressure of higher production sometimes machine operators do not maintain accurate time according to the actual process so that less quality product is produced and may reject. So our suggestion is to increase machine and reduce the pressure on the operator.
- Should increase understanding between the top level personal and floor level personal.
- Finishing section need to be enlarged well as more technical persons need to be employed there.
- The m/c stoppage time should be analyzed and minimized. The maintenance should be carried out when the m/c is out of action (Wherever possible) and routine maintenance should be carried out regularly**.**
- In knitting and finishing section every workers should use mask to make protect them from fly. Otherwise the exhaust air system should be more effective.
- Workers are not interested to wear their gown & hand gloves.

- In the Laboratory there is no technical person, a textile engineer may be employed here.

- There is shortage of proper light in the dyeing and finishing floor, specially, when smoke is produced from dryer and stenter. Proper lighting should be provided in the floor.

- In Laboratory, only one sample dyeing machine is used. The rest two are out of order. So, if this activate one is in problem then the lab dip process may be hampered. So, another lab dip dyeing machine may be purchase to reduce the load of current one.

- The spectrophotometer is virus affected. This must be quarantine immediately.

- The person at the top level of a department must take good care of the trainees & he should provide all kinds of support to them.

LIMITATION OF THE REPORT:

- Because of secrecy act, the data on costing and marketing activities have not been supplied.
- We had a very limited time. In spite of our willing to study more it was not possible to do so
- Some points in different chapters are not included as these were not available.
- It is not possible to hold the whole thing of a textile industry in such a small frame as this report. So, try our hard to summarize all the information that we are provided.

FINALLY:

I am lucky enough that I have got an opportunity to get industrial training at **Niagara Textiles Ltd.** During this training period I have visited different section of the mill and received enough co-operation and support from the authority and all the personnel of different sections. Here, all the officers and the stuffs are very cordial and very much devoted to their duties, which is also learning for me.

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